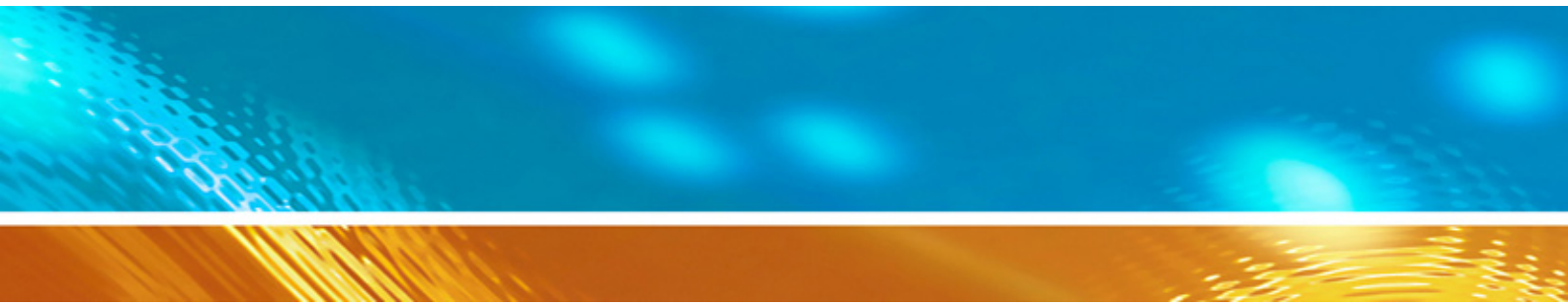
VAISALA

INSTALLATION MANUAL



IRIS™ and RDA SOFTWARE

M211315EN-E

PUBLISHED BY

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CHAPTER 1

ABOUT THIS MANUAL

This manual provides information about installing and upgrading IRIS and RDA software.

1.1 Audience

This manual is intended for system managers responsible for installing the software and maintaining the system. Familiarity with the operating system and computer concepts is required.

1.2 Version Information

Table 1 Manual Revisions

Manual Code	Description
M211315EN-E	This manual. February 2016
M211315EN-D	Previous manual. Fourth version. September 2014
M211315EN-C	Previous manual. Third version. November 2013
M211315EN-B	Previous manual. Second version. March 2013
M211315EN-A	Previous manual. First version.

1.3 Related Manuals

Table 2 Related Manuals

Manual Code	Manual Name
M211316EN	IRIS and RDA Utilities Manual
M211317EN	IRIS Radar Manual
M211318EN	IRIS Programmer’s Manual
M211319EN	IRIS Product and Display Manual
M211320EN	RCP8 User's Manual
M211321EN	RVP8 User's Manual
M211322EN	RVP900 User's Manual
M211452EN	IRIS and RDA Dual Polarization User’s Manual

1.4 Document Conventions

Different typefaces, type styles, and phraseology indicate specific user interactions with the system as illustrated in Table 3.

Table 3 Document Conventions

`$` `#`	The dollar sign is shows the operating system prompt, though it may differ from one system to the next. On UNIX systems, the pound sign is also used to indicate the superuser's operating system prompt. Prompts specific to a utility are shown as they are displayed by the utility.
`user input command parameter`	User input and command syntax are printed in bold, monospaced type. User-supplied parameters are shown in italics. Enter the command as shown and supply the appropriate parameter or argument values. All commands are terminated by pressing the **Enter** button (not shown). In addition, UNIX filenames and keywords are printed in bold, monospaced type when referenced within the text.
`Command output`	Some commands generate output. The text of this output is displayed in monospaced type.
Ctrl + **X**	Some key sequences require you to press the Control key and another key at the same time. When you see this notation, hold down the **Ctrl** button and press the specified key.

1.5 Safety

Throughout the manual, important safety considerations are highlighted as follows:

WARNING	Warning alerts you to a serious hazard. If you do not read and follow instructions very carefully at this point, there is a risk of injury or even death.

CAUTION	Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.

NOTE	Note highlights important information about using the product.

1.6 Trademarks

IRIS™ is a trademark of Vaisala Oyj.

Linux® is a registered trademark of Linus Torvalds.

Red Hat® and Enterprise Linux® are registered trademarks of Red Hat, Inc in the United States and other countries.

UNIX® is a registered trademark of The Open Group.

All other company and product names may be trademarks of their respective companies.

CHAPTER 2
INSTALLATION

2.1 Before You Start

The IRIS and RDA software is supplied on a DVD containing files that work on Red Hat® Enterprise Linux® 6 (RHEL6) for servers. Additionally, installation files may be downloaded at ftp.sigmet.vaisala.com. We provide an X-Windows based install utility for installing the software on local or remote systems.

Before you install the IRIS/RDA software, do the following:

1. Check the operating system version. Verify that the operating system level is at least CentOS5 or Red Hat Enterprise Linux 5 (RHEL5) for desktops. See Appendix A, Installing CentOS 7.x on page 81 for installation details. Other Linux brands work as long as the kernel version is at least 2.6.9.

NOTE Vaisala does not provide support for operating system specific support questions on other Linux brands.

NOTE Vaisala provides an automated installation procedure for installing RHEL5.

2. Use the following sections to perform a new install or upgrade:
   - "Mount the CD" on page 12
   - "New Software Installation" on page 13

2.2 Mount the CD

1. Log into the system as 'root' and start the X-Windows environment (if it is not already running) with:

   `startx`

2. Insert the CD into the CD-ROM drive.

   The system must mount the CD. The installation scripts expect the CD to be mounted at:

   `/mnt/cdrom`

   If Linux automounts it, record the mount device using **`df`**, and **`unmount`** it with:

   ```
   # umount /dev/cdrom
   ```

3. Mount it with:

   ```
   # mount /dev/cdrom /mnt/cdrom
   ```

NOTE On a new system, you may need to first create the `/mnt/cdrom` directory with the following command:

```
# mkdir /mnt/cdrom
```

Type of installation:

- If this is a new installation, go to "Performing a New Software Installation" on page 14
- If this is an upgrade, go to "Performing a New Software Installation" on page 14

For a general description of the **install** utility and its options, "Install Utility Window Options" on page 29.

2.3 New Software Installation

2.3.1 Preparing for a New Software Installation

Follow the instructions in this section if you are installing a new IRIS/RDA system. If you are upgrading from a previous IRIS/RDA version, go to "Upgrade Installation" on page 22.

If you used the **sigconfig** script described in:

- Appendix A, Installing CentOS 7.x on page 81
- Appendix B Installing CentOS6 on page 107

go to "Run Setup Utility" on page 16.

If this is a new installation on a new computer or a new hard disk, read Appendix A, Installing CentOS 7.x on page 81 before proceeding.

1. Check that there is enough disk space.

   The IRIS/RDA software uses about 100 megabytes on the disk. The data stored on disk by IRIS typically uses at least 100 megabytes. Thus, you need at least 200 megabytes of free space on the disk before the installation is begun. The software and data can be on separate disks, if desired. If there is not enough space, unnecessary files should be deleted before proceeding. You can see the amount of free disk space using the `df` command.

2. Check for conflicting user names.

   The IRIS software (including the installation procedure itself) requires the creation of two new login names: `operator` and `observer`. If either of these names are already in use, they must be changed. You may, however, use any convenient (new or old) group name for these

two new login names. In this discussion, it is assumed that the group name is "users". Use the **redhat–config–users** or **linuxconf** utility on Linux to make the changes.

NOTE	Do not proceed without making these login name modifications. The install utility cannot run if the `operator` name is undefined. If this is a new system (OS installation) see Appendix A, Installing CentOS 7.x on page 81 and run **sigconfig** from the CD.

3. Choose an anchor point for the IRIS directory tree.

2.3.2 Performing a New Software Installation

Log into the system as 'operator' and start the X-windows environment. Become the 'superuser' by using the `su` command and supplying the appropriate password. (**NOTE:** If you are performing a network-based install to option, it is not necessary to become the 'superuser' – see "Local and Remote Login" on page 34). You can run the **sigconfig** script, which modifies the OS, and also installs IRIS as an alternative.

NOTE	A new installation completely overwrites any existing files in the `${IRIS_ROOT}/bin`, and `${IRIS_ROOT}/config trees`. **Make sure you do not have any irreplaceable data in these areas before proceeding.**

To install a new software installation:

- For Linux systems (IRIS):

```
# cd /mnt/cdrom/RHEL5/iris
```

- For Linux systems (RDA):

```
# cd /mnt/cdrom/RHEL5/rda
```

- For all systems:

```
# ./install
```

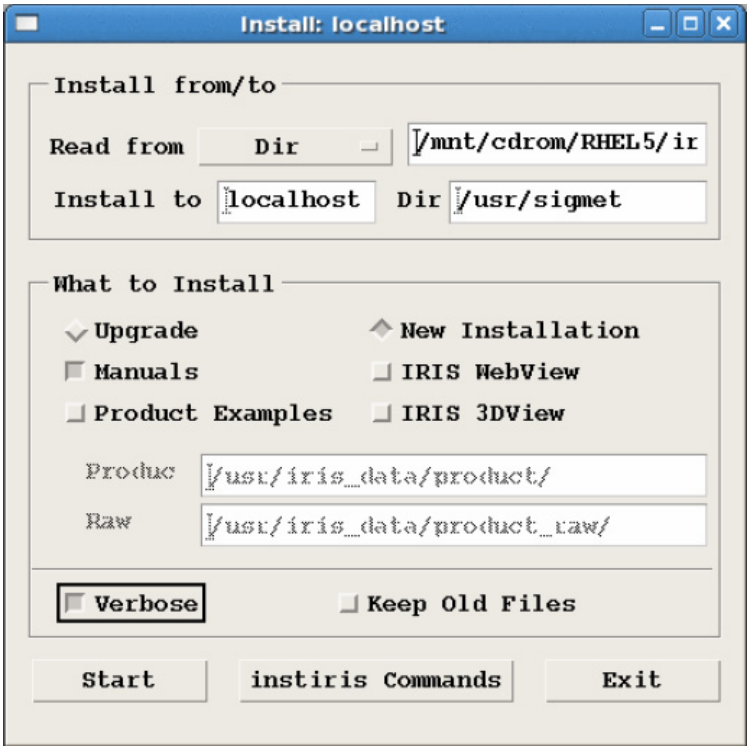


Figure 1 New Install Dialog Box

1. In the **What to Install** section of the install utility window, select the **New Installation** box (as shown in Figure 1).

NOTE	If you are performing a RDA and IRIS install, first install the IRIS software, then install the RDA software with the **Keep Old Files** box selected.

2. Optionally, you may select other support software packages to install by selecting the appropriate boxes (**IRIS WebView**, **IRIS 3DView**, etc.).
3. Click **Start**.

   The installation utility takes a few minutes to complete and prints progress messages as it runs.
4. Once installation is complete, unmount the CD-ROM by:

```
# cd /

or

# eject /mnt/cdrom
```

5. Continue with the following sections to complete the installation process and required configuration.

NOTE	For a detailed description of the full capabilities of the install utility, see "Install Utility Window Options" on page 29.

Now for a new OS installation, run the **sigconfig** steps manual as described in Appendix A, Installing CentOS 7.x on page 84 (CentOS5) or C.3 Sigconfig on page 136 (RHEL5).

2.3.3 Run Setup Utility

Use the **setup** utility to configure your software (this utility is described in detail in the *IRIS and RDA Utilities Manual*).

```
$ setup
```

Successful operation of **setup** does indicate that the utilities can modify the configuration files. All of the configurations in the **setup** utility should be checked for your system.

If your system is an **analysis or display system,** be sure to set that in the General setups, and in the RVP section specify that there is no processor, and the RCP should specify that there is no antenna.

If your system is a radar system (i.e. connected to an antenna/signal processor) the values in the RVP and RCP sections of setup are particularly important. These need considerable fine tuning before the RCP can be controlled accurately. For example, the maximum antenna speeds in both azimuth and elevation should be set at least six degrees per second slower than the maximum the antenna can go. To check how fast it can go, widen the limits, then run the **antenna** utility to see where it maxes out. The **antenna** utility is also discussed in the *IRIS and RDA Utilities Manual*.

Finally, in the license section of the utility, enter a desired site name. Make sure that this is unique and somehow relates to your radar site. Also, if you plan on sharing data with others, it is important that the site name is recognizable.

2.3.4 Get Your License

Run `show_machine_code`, which displays licensing information for your system — Machine code, Check code, Site ID, and OS Version number. For new installations, **you need to get a new license number from Vaisala.**

Contact Vaisala (helpdesk-support@vaisala.com) with the information supplied by `show_machine_code`, and for the license numbers If the machine code is the same as on your current license, no upgrade is required.

When you receive the new license, run the **setup** utility and click the `License` button. Type the numbers at the `Features License` and `Products License` prompts.

For display systems, please use our free IRIS/Display license service on our web site (http://www.vaisala.com).

2.3.5 Run sigmet_env

Run the **sigmet_env** utility program. It checks for obvious mistakes like directories which do not exist. The **sigmet_env** defaults to IRIS only systems, to check the directories on an RDA system, run **sigmet_env –rda.**

2.4 Initial Configuration

2.4.1 Setting Up for SCP and Other SSH Commands

This is the preferred method for copying files between systems. First verify that the ssh daemon is running on both systems. This can be done with the command:

```
$ ps -aef | grep sshd
```

To turn on sshd run the following command as root:

```
# chkconfig --add sshd
```

This program is configured with the file */etc/ssh/sshd_config*. The default file should work for basic IRIS scp needs. In order to authorize opening X applications on your display afer ssh'ing to a remote machine, edit the file to add the following line (You can get the same effect by always typing "ssh –X"):

```
X11Forwarding yes
```

The security authorization is different for each user, so be sure to run all the applicable commands while logged in as operator. On the source machine generate your private key with the following command:

```
$ ssh-keygen -t dsa
```

You are prompted for a password, enter blank for no password. This creates the directory $HOME/.ssh with the files: **id_dsa** and **id_dsa.pub**.

Copy the contents of the **id_dsa.pub** file to all the target machines. Append it to the **$HOME/.ssh/authorized_keys** file. If there is no such file, then rename it to match. Ssh is picky about directory protections, the.ssh directory must have protection 755. Now test by trying a simple command like:

```
$ ssh target date
```

The first time this is run, it asks you to confirm the target host. You should not receive a prompt for a password. If you are asked for a password, there is a problem, check the */var/log/secure* log file.

Because the IRIS daemons run as root, you must copy the radarop key files to the */root/.ssh* directory. This is a bit tricky because root does not have read access to the */home/radarop/.ssh* files. Use the following commands:

```
$ cd
$ cd .ssh
$ cp id_dsa* /tmp
$ su -

# mkdir -m 700 .ssh
# cd .ssh
# cp /tmp/id_dsa* ./
```

Log out and back in again so the new ssh files can take effect:

```
# exit
$ su -
```

Now test in a similar way by trying a simple command like:

```
# ssh radarop@target date
```

Again, the first time this is run, it asks you to confirm the target host. After you get this working, delete the temporary file copies:

```
# exit
$ cd /tmp
$ rm id_dsa*
```

2.4.2 Setting Up for RCP and Other R Commands

Old IRIS systems use the **rcp** shell command internally to copy product files between computers over the network. For security reasons, this feature is by default blocked, and requires configuration to enable it.

There are two mechanisms to configure the remote commands: The *~/.rhosts* file and the */etc/hosts.equiv* file. These files are placed on the receiving computer to enable access from the outside world. The *.rhosts* file is placed in each user's login directory, and the hosts.*equiv* file is placed in the */etc* directory and applies system wide. We recommend using the *hosts.equiv* file and checking to make sure there is no *.rhosts* file for the applicable users. Note that root requires a private *.rhosts* file to do rcp. This file is basically a list of hostnames and user names. Though wildcarding is allowed, we recommend adding every host and user who needs it.

This can be little tricky to configure, so always test manually. The development cycle is very simple. Test with an rsh command like:

```
$ rsh target date
```

If it fails, then edit the hosts.equiv file and try again. Once the rsh commands are working, the rcp commands should work. A good starting point it to rsh to your own host to see if it works. If that does not work then certainly you cannot expect it to work from other hosts.

Table 1 Sample /etc/hosts.equiv File

# Comments allowed	
radar.company.com	operator
analysis.company.com	operator

2.4.3 Serial Line Setup

Set World Read/Write Permission:

Each serial device must be set so that users can read and write to it. For a device called `/dev/ttyS0`, you can test this with the following command:

```
# chmod 666 /dev/ttyS0
```

The permissions change back to the default values during the bootup process. To set this at boot on RHEL6 and RHEL5 create the file */etc/udev/rules.d/10-sigmet.rules*. Insert a line which reads:

```
KERNEL=="ttyS0", NAME="%k", GROUP="uucp", MODE="0666",
OPTIONS="last_rule"
```

Note that the "tty" is the group owner, which may vary on different systems. Check what yours should be by first typing:

```
$ ls -l /dev/ttyS*
```

Disable Modem Manager:

If your serial device supports modem control lines, then the modem manager daemon checks if there is a modem attached. This causes the device to be busy at boot time, and causes the device lock up on open. This happens, for example with a USB-to-serial converter. Please disable this by adding a command like this to your */etc/udev/rules.d/10–sigmet.rules* file:

```
ATTRS{idVendor}==”067b”, ATTRS{idProduct}==”2303”,
ENV{ID_MM_DEVICE_IGNORE}=”1”
```

Disable Logins on the Serial Lines:

A problem that sometimes arises when assigning the computer’s serial lines to IRIS is that the system may already be running a `getty` process to log users onto that line. This process must be removed before IRIS can use the serial line. On RHEL6, this is controlled by the */etc/sysconfig/init* file. On RHEL5 systems, there are command statements in the */etc/inittab* file that startup `getty`. These should be modified or commented out (using a ’#’ at the beginning of the line).

2.4.4 Shared Memory Size

On RHEL systems there is a system kernel parameter which determines the maximum shared memory allowed. The default size varies on different OS versions, but it often is 32 MB. Typically this causes a problem allocating the product inventory in IRIS, with an error such as:

```
EINVAL; Invalid argument <shmget iris_products (52975876
bytes)>
```

If you do not need it, you can lower the maximum products on disk to 60,000 in **setup/general**. Or you can raise the limit on your system by editing the */etc/sysctl.conf* file and adding a line which reads, for example:

```
kernel.shmmax = 100000000
```

Then reboot for this to take effect.

2.4.5 Installation Security Issues

During the course of an installation, the **install** utility needs to perform certain root level privileged operations. Such operations include the setting of the ownership and mode of certain IRIS executables. Because normally the **install** utility is run by the root user, these operations are allowed without question.

In the case of doing a network based installation using the "INSTALL TO" option, this installation method is not performed by root, but is instead performed by the operator. To grant the user operator the permission required to do these privileged operations, the iris **install** utility uses the Unix **sudo** facility.

By use of the **sudo** utility, the operator effectively is allowed to execute the **install** utility as the superuser. There are some minor security implications of this. Under most circumstances it is fine for the operator to perform these operations. If you wish to allow the operator to perform these actions (normal scenario), then no special action is required – just run install as documented in the following sections.

By disabling the root privileges for the **install** utility, when doing a network based "INSTALL TO" installation, after the install is finished, you must login to the remote system as root to complete the privileged part of the installation. The **install** utility prompts you with the exact command to execute in this case.

2.5 Upgrade Installation

2.5.1 When Should I Upgrade?

If your system is operational and you do not require the new features of a release, then often the best thing is to NOT upgrade. Check the release notes available at www.vaisala.com/sigmet in the customer support section to see what changes have been made since your current release was installed. Be sure to check the release notes for all intervening releases.

To check the release that you have currently installed, you can type the command:

```
$ show_machine_code -version

IRIS Version 8.00 (indicates version 8.00)
```

2.5.2 What Should I Do Before I Upgrade?

1. Save customized files.

   As part of the upgrade, many of the files in the tree are erased and replaced. If you have placed anything important there, be sure to save it first. The upgrade procedure preserves everything in `${IRIS_CONFIG}`.

2. Print the current setup.

   Run the **setup** utility on the old system and generate an ASCII listing file with the File/List command. The format of these files can change between software versions. Therefore, some of the information may have to be entered again.

3. Before you can upgrade, you must make certain that all sigmet applications are stopped. You can do this by exiting any **IRIS/RDA** utilities that you are running and executing the following commands.

For IRIS:

```
$ qiris
$ qant
```

For RDA:

```
$ su
# service rvp8 stop (or service rcp8 stop)
# service dspexport stop
```

Then type **ps_iris** to verify that all sigmet processes are stopped. If there are remaining processes, you can stop them as root with the "**kill** *<process ID number>*" command. The process ID number is the first column of numbers from the **ps_iris** output.

2.5.3 Where to Get Software Upgrades?

The RVP8 and RCP8 (collectively the RDA) and IRIS are active products. New features and bug repairs are provided in the form of software upgrades. Software upgrades from Vaisala can be obtained from two sources:

- **FTP (Internet) Upgrades**—These are available from ftp.sigmet.com. For example, to obtain the release RDA 8.00 you would go to:

  `ftp.sigmet.com/outgoing/releases/8.X.X`

  "Getting the Network Upgrade Files" on page 24 shows a typical ftp session. These public releases are FREE of charge but do not include support services unless you are under warranty or have purchased a support contract from Vaisala. Contact sigmet-support@vaisala.com if you need to arrange a support contract.

- **CDROM Upgrades**— These are provided as part of a support contract or upon request.

2.5.4 How Should I Upgrade?

There are two basic upgrade techniques:

- **Upgrade using "install" utility**—This is the preferred technique since it leaves all configuration files intact. This is described in "Performing an Upgrade Installation" on page 27.

- **CD–ROM Operating System Upgrade & Vaisala software Full Re-Install**—Backup your configuration files and network files and then do

an install from scratch as described in Appendix A, Installing CentOS 7.x on page 81. Then restore your configuration files to the new installation. This is the preferred technique **only** when it is required that you upgrade the operating system which might be necessary in the event of hardware or new hardware.

Once you have decided on either a network or CDROM upgrade, then proceed with the upgrade installation as described in the sections below.

2.5.5 Getting the Network Upgrade Files

There are two ways to get the network upgrade files. Both techniques use ftp to get the files from ftp.sigmet.com. The ftp client service allows you to run an ftp session and "get" files from another networked computer:

- **Use your IRIS workstation/RVP8/RCP8/RCW to get the files**— a one-step procedure that requires that you have internet access.
- **Use another machine on the network**— a two-step procedure to first ftp the files to another computer, and then "get" them from this machine by running ftp on the IRIS workstation/RVP8/RCP8/RCW. Note that an alternative is to copy the files to a CDROM.

Both techniques require some familiarity with ftp. Here we assume that our computer with the name **sigcomp** has direct internet access (the one-step procedure). The two-step procedure is similar.

One-step Approach: Direct Download:

- On your IRIS Workstation/RVP8/RCP8/RCW create a directory called */tmp/iris-X.XX*. If you are also downloading RDA software, use a separate directory named */tmp/rda-X.XX*. Here the X.XX is the version number of the RDA software that you want to install. This naming convention makes it easy to identify the version of the install files. You should make a directory for each version and type (IRIS/RDA) of software that you download. As **operator** type (assuming version 8.11.0 for all examples here):

```
$ cd /
$ mkdir /tmp/rda-8.11.0
```

- Position yourself in the */tmp* directory by typing:

```
$ cd /tmp/rda-8.11.0
```

Note that on a windows machine, all of the commands below can be typed in the MS–DOS prompt window (remember to use the "\" backslash for DOS).

- Start ftp and follow the sample session below (your responses are indicated by **bold**)

```
$ ftp ftp.sigmet.com
Connected to ftp.sigmet.com
220 Welcome to Vaisala Westford Operations FTP Serve
Name: anonymous
331 Guest login ok, send your complete e-mail address as
password.
Password: <Use your email address>
230 Guest login ok, access restrictions apply.
ftp> cd outgoing/releases/
ftp> dir
```

- You see a directory listing of available releases. You are looking for an 8.11.0 release, then:

```
ftp> cd 8.11.0
ftp> dir
```

- Enter the appropriate directory for your OS version. Round the version down, so if you are running RHEL5.1, use RHEL5:

```
ftp> cd RHEL5
ftp> dir
```

- In the listing of the release type, look for the "rda" release, then:

```
ftp> cd rda
ftp> dir
```

- When you see a list of files with file sizes, download all the files. The absolute minimum **required** files for an upgrade are:

```
app.gz
install
install.gz
install.rf
instiris
tplates.gz
```

- Make a list of the files that you want to download including at least the six files in the list above. Of the other files on the FTP site, man.tgz contains the manuals, and web.tgz contains the IRIS/Web feature which you might not need. Prepare to download by selecting BINARY file transfer:

```
ftp> bin
200 Type set to I.
```

NOTE	Important: If you do not specify BINARY transfer, the download does not work.

- Now "get" the files, for example:

```
ftp> get app.tgz
200 PORT command successful.
150 Opening BINARY mode data connection for app.gz
(4897560 bytes)
226 Transfer complete.
```

  You get a confirmation that BINARY transfer is being used and the size of the file in bytes is displayed. Depending on the size of the file and the speed of your connection, the download could take many minutes. When the file transfer is completed, you get a confirmation message.

  You can also use the multiple get command "**mget**" to get all the files:

```
ftp> mget *
```

  You are prompted for each file download so you can still pick-and-choose by typing "`y`" or "`n`" to select (yes or no).

- After you have downloaded all of the files, then end your session by typing:

```
ftp> quit
221 Goodbye
$ (back to UNIX prompt)
```

For the one-step approach, you have all of the files that you need in the directory */tmp/rda-8.11.0* on the RVP8.

Completing the Two-step Approach Using Another Computer:

The two step approach is to use another computer to get the upgrade files and then get these files on the RVP8. The first step of getting the files from Vaisala is done analogus to the one-step approach described above. The second step is to ftp the files from the other computer to the RVP8. This is also analogous to the procedure described above. You may also put the files on a CDROM, mount the CDROM on the RVP8, and then copy the files to the RVP8.

The end result of all these procedures is that the upgrade files are on the RVP8 in a directory called */tmp/rda-X.XX. N*

Set the Modes on the Files:

Become root using the **su** command and password. Go to the RVP8 directory where the files were downloaded and change the mode on two of the files that require execute privilege, i.e.,

```
# cd /tmp/rda-8.11.0

# chmod +x install

# chmod +x instiris
```

You are now ready to move on to the next section.

2.5.6 Performing an Upgrade Installation

If you are upgrading from a previous Vaisala system:

1. Login to the system as 'operator'.
2. If it is not already running, start the X windows environment.
3. Become the superuser by using the 'su' command and supplying the appropriate password (Note network installations do not use root–see "Install To Option (Including Network Installs)" on page 31).

WARNING Warning: An upgrade installation *overwrites* any existing files in the `${IRIS_ROOT}/bin` tree. Backup any important files before proceeding.

LINUX SYSTEMS (IRIS):

```
# cd /mnt/cdrom/RHEL5/iris
```

LINUX SYSTEMS (RDA):

```
# cd /mnt/cdrom/RHEL5/rda

# ./install
```

4. In the **What to Install** section of the **install** utility window, select **Upgrade**.

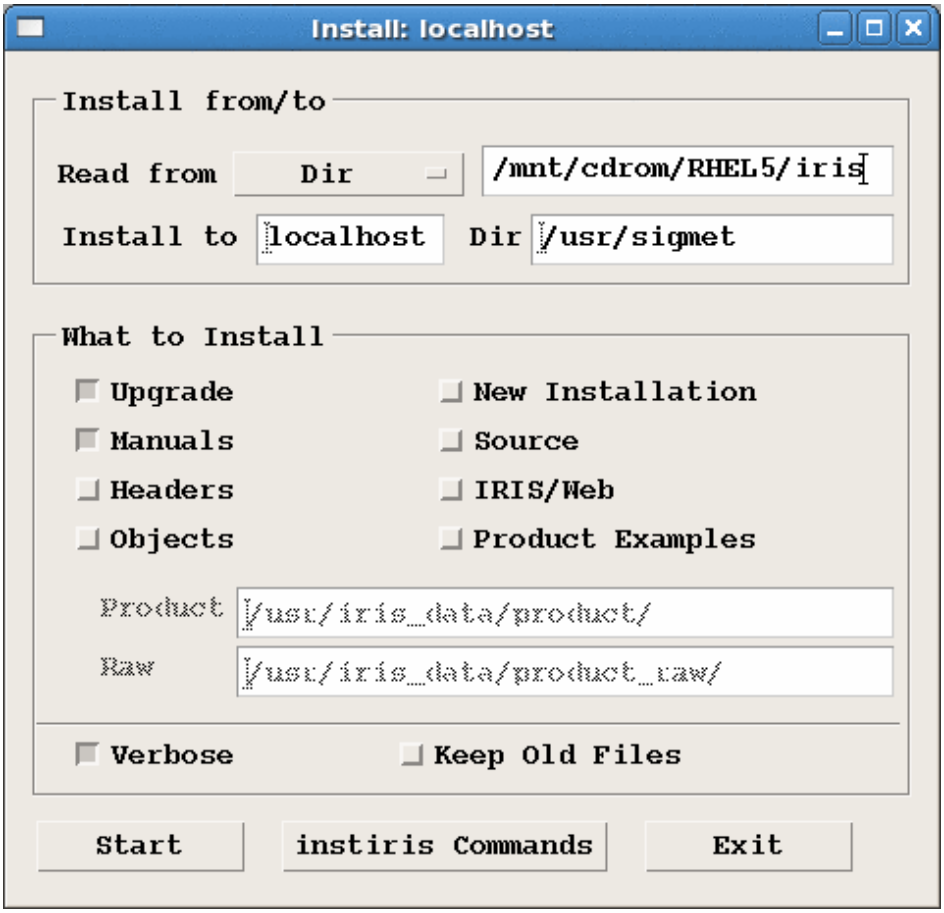


Figure 2 Upgrade Install Dialog Box

5. Optionally, select other optional software packages to install in the **What to Install** section.

6. When you are ready to perform the installation, select **Start**.

NOTE	If you are performing a RDA and IRIS install, first install the IRIS software. Then select **Keep Old Files** and install the RDA software.

The installation script takes a few minutes to complete and prints progress messages as it runs.

7. When the installation is complete, unmount the **CDROM**.

```
# cd /

# eject /mnt/cdrom
```

8. If you are updating RDA software in a system with RVP901 (RVP9IFDR), you must also update the RVP901 Software. See "RVP9

(RDA) Software Installation" on page 39.

2.5.7 Post Upgrade Tasks

Because some setup files may have changed formats, please run the following command:

```
$ makeAsciiSetups
```

2.6 Install Utility Window Options

The **install** utility is on the distribution CDROM, as well as in the `${IRIS_ROOT}/install` directory after installation.

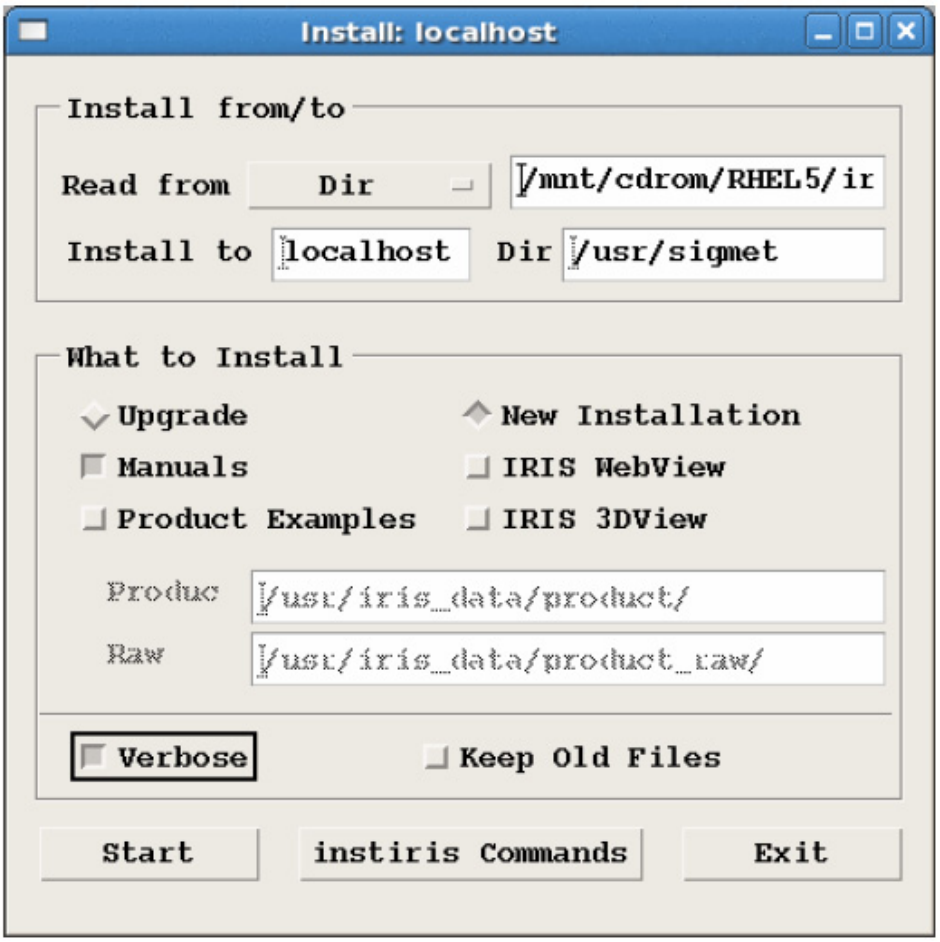


Figure 3 Install Dialog Box

The first section is labeled **Install from/to**. This default information (shown above) assumes that the installation is from the directory from which the installation was run, and are installing to the default directory (*/usr/sigmet*) in the local computer. In "Install Utility Window Options" on page 29, other options for **Install from/to** are discussed.

The second section is labeled **What to Install**. In this section, you choose which of many different files to install. Depending on which button(s) are pressed, there are three basic different installation that can be performed:

- A **New Installation** of the software.
- An **Upgrade** installation on a system where an older version is already installed.
- Do not install the application software. Install one or more optional support software packages such as **Manuals**, **IRIS Product Examples**, **IRIS WebView,** or I**RIS 3DView**. See "Install Utility Window Options" on page 29.

Note that when doing either a **New** or **Upgrade** installation, you can also install at the same time one or more of the optional support software packages.

2.6.1 Read From Option

The **install** utility allows for the files used in the installation to come from one of three different locations. The default location is the **DIR** this means that the installation program automatically populates the **Read From** option with the path where the install command was run (this implicitly works for **CDROMs**). However, by using the **Read From** button, you can choose to access the files also from either the files already installed on your system (**Local** option).

When selecting the **DIR** option, you can type a directory in manually.

When selecting the **Local** option, the files are taken from the local installation of IRIS or RDA already in this computer and copied to another destination. In this case in the box to the right of the **Read From** button, you must fill in the location of the root directory of the IRIS software on your local system. By default this is the translation of the **IRIS_ROOT** environment variable, but you can override this if you wish.

When selection the **Dir** option, this implies that the files are taken from a temporary directory on the local computer and copied to another destination. In this case in the box to the right of the **Read From** button

which is automatically populated with the directory where ./install was executed from.

2.6.2 Install To Option (Including Network Installs)

The **Install To** fields must be entered in the **install** window. These fields choose where the IRIS software are installed. By default, these fields are be filled-in, in such a way that the IRIS software is installed to the local system in the default */usr/sigmet d*irectory.

However, with the **Install To** fields, you can choose to install the software to any other computer on your network, or to any directory on your computer.

To install to a remote computer **(Network Install)**, you must run the **install** utility as operator rather than from root:

```
$ cd /usr/sigmet/install

$ ./install
```

In the **install** utility window, enter the *nodename* of the remote computer that you are installing to in the **Install To** field. And if you wish to install to a directory that is different from */usr/sigmet*, enter this directory into the **Dir** box immediately to the right of the **Install To** box.

These network installations are very convenient, as if you update a single system on your network from a **CDROM** by choosing all of the default options in the **Install from/to** section of the **install** utility, you can then install from the Local directory of this first machine (Local option) to every other machine on your network by putting their hostnames, one at time, into the **Install To** field. This is a big time saving operation.

After the software has been installed on the remote machine, you must complete the procedure by setting the ownerships, modes, and application defaults on the remote machine itself. This can be done by way of a remote login (as root), as in:

```
# rlogin Remote_Machine -l root

# cd /usr/sigmet/install

# ./instiris -setown -v
```

2.6.3 Manuals Option

To install the Online Manuals, prior to starting the install, press the **Manuals** button in the **What to Install** section of the **install** utility.

This installs both the online manuals and the viewer program. It uses approximately 38 MB of disk space. Generally the online manuals are more up to date than the printed versions.

2.6.4 Product Example File Option

When using a IRIS/RDA release **CDROM**, it is possible to install example **Product and Raw Product** files. To do so, press the **Product Examples** button prior to clicking **Start**. Also, you must fill in the Product and the Raw fields next to the Product Example button. These fields are automatically filled in with default installation directories for IRIS Products and IRIS Raw Products. If you use different directories for these products, edit these fields prior to starting the install.

This places a number of IRIS type product files in the above directories. These files can either be viewed directory, or may be re–ingested to make other products.

2.6.5 IRIS WebView Option

IRIS WebView can be installed on an IRIS analysis machine used for serving pictures over the internet.

2.6.6 IRIS 3DView Option

IRIS 3DView can be installed either on an IRIS analysis machine, or a machine without IRIS at all. Refer to the *IRIS Product & Display Manual* for more details.

2.6.7 Verbose Option

Normally, **install** does its work silently, and prints only minimal progress messages as it runs. To see more details, press the **Verbose** button prior to clicking **Start**.

2.6.8 Keep Old Files Option

This option should only be used when upgrading or installing a computer system that has both RDA and IRIS software installed. When using this option, make sure that to install IRIS first and then install the RDA software with this button pressed. It prevents **install** from erasing the IRIS files just installed. The **Product Examples** button never erases old data.

2.7 Troubleshooting

2.7.1 File Ownership and Protection

Sometimes there are problems after an installation with access to some of the files. Typically, this is evidenced by an error message saying that the user does not have privilege to do an operation. This can happen when starting a program or when calibration files are accessed. If you should have this problem, run the `instiris` script, as shown below:

```
# instiris –setown
```

This procedure goes through the */usr/sigmet* directory tree, changing the owner of all files to `operator` and setting the protection, as follows:

- Directories—`rwxrwxr-x`
- All files, except executable files—`rwrw-r--`
- Executable files—`rwsrwsr-x`

Always use `instiris -setown` to fix the protection of your files. Do not try to change the protection of these files yourself.

2.7.2 Authorizing Remote X–Windows on Your Node

To allow IRIS systems running on other nodes to send output to your screen, enter the command:

```
$ xhost +<host>
```

Where <*host*> is your remote hostname, or IP address. Once you have this working to your satisfaction, edit your */etc/profile.d/sigmet.sh* file and

put the appropriate command at the end of the file. This causes it authorize the windows as soon an anyone logs in. You can also put such a command in your home directory *.bash_profile* file if you want just one user to authorize.

2.8 Basics of Login, Logout, and Shutdown

2.8.1 Power-up Procedure

When you power-up the computer, the system goes through an automatic startup of the operating system at the end of which the software starts and performs power–up self tests. See both the *RVP8 & RCP8 User's Manuals*.

If you are not doing any diagnostic or software maintenance work on the system, there is no need to log-in after power-up; simply turn the unit on and your application software takes over.

2.8.2 Local and Remote Login

There are two ways to login to a SIGMET system:

- **Local login—**the local keyboard, mouse, and monitor can be used, or via a KVM.
- **Remote login—**if **telnet** is enabled you can use this for remote access. Check with your network administrator.

For the remainder of this discussion it is assumed that local login is used.

2.8.3 Default Operator and Root Login Passwords

There are two default users defined in the standard software installation:

- **Root** (with password: **xxxxxxxx**; 8 lower case x)—this is for operating system maintenance functions.
- **Operator** (with password: **xxxxxx**; 6 lower case x)—this is for SIGMET application software maintenance functions.

These are all described in detail in the *IRIS and RDA Utilities Manual*.

Your system administrator can change either of these passwords by using standard Linux password support.

2.8.4 Login Procedure

2.8.4.1 Local Login as Operator After Power-up

1. Connect keyboard, mouse, and monitor and then cycle power on the system to force a reboot. This causes Linux to recognize these devices on power-up.
2. At the power-up **login** prompt, type **operator** and press **Enter**.
3. When prompted, provide the appropriate password (factory default is **xxxxxx**, 6 lower case x).

   An X-Window screen appears.
4. Right-click the mouse and select **New Window** to get a terminal window.

   The top of the terminal window shows, for example:

   ```
   operator on rvp8-1 : /home/operator
   ```

   that is, your user name, the node name of the system, and the current directory path.

NOTE	If you would like to have a terminal with a bigger font, you can type `sigterm`.

2.8.4.2 Switching from Operator to Root Login Using "su"

The easiest way to switch to a root login for system administration work is to type the super user command `su` and then give the root password. The prompt changes from `$` to `#` indicating that you are root.

2.8.4.3 Exiting "su" Root Login to Return to Operator

In an X–terminal where you have become the "super user (su)", type `exit` to return to operator. The prompt changes from `#` to `$`.

2.8.4.4 Local Root Login after Power-up

To login as root after a power–up or after exiting X–Windows, type `root` and press **Enter** at the login prompt, then give the appropriate password (factory default is **xxxxxxxx**; 8 lower case x).

You are in a full screen terminal. This is not as convenient as X–Windows since only one terminal can be displayed on the screen.

NOTE	If you need a second full screen terminal type **Alt**+**F2**. You can return to your original terminal by typing **Alt**+**F1**. The other function keys can provide additional terminals.

2.8.5 Logout Procedure

2.8.5.1 Logout from X-Windows

- Method 1: Right-click the mouse and select **Exit**.
- Method 2: Simultaneously press **Ctrl+Alt+Backspace** on the keyboard.

You are logged out and the screen shows the initial login prompt on the full screen terminal.

2.8.5.2 Root Logout from Full Screen Terminal

If you logged–in as root from the power-up full screen terminal.

2.8.6 Power-off Shutdown Procedure

NOTE	If you need to swap PCI cards in the chassis, you must first do a power-off shutdown.

1. As either operator or root type `poweroff`. The system goes through a shutdown sequence. When it is done **"Power down"** is displayed.
2. Press the power switch located on the right lower front of the chassis.

2.9 RVP8 and RCP8 (RDA) Software Installation

2.9.1 Install the Upgraded Kernal Module

After you upgrade you may get an error message saying that there is a kernel module mismatch. This is easily fixed by rebooting. As an alternative you can restart the kernel module with the following commands:

```
# service rdasys stop

# service rdasys start
```

2.9.2 Installation Steps to Flash FPGA in Vaisala Devices

To install FPGA software into each of the Vaisala components, you must make an inventory of what is in your system and then issue an `rdaflash` command to each one:

1. Login as **operator** (with password **xxxxxx** (6 x)

   You enter X–Windows.

2. Right-click the mouse and start a terminal window.

3. For each Vaisala component type the appropriate command:

Vaisala Component	Unit ID	If RVP8, type:		
Standard RVP8/Rx Card	-0	rdaflash	-program	rvp8rx-0
Standard I/O-62 Card	-0	rdaflash	-program	io62-0
Standard Connector Panel	-0	rdaflash	-program	io62cp-0
Standard RVP8/IFD	-0	rdaflash	-program	rvp8ifd-0
Optional RVP8/Tx Card	-0	rdaflash	-program	rvp8tx-0
Optional 2nd RVP8/Rx	-1	rdaflash	-program	rvp8rx-1
		If RVP8, type:		
Standard I/O-62 Card	-0	rdaflash	-program	io62-0
Standard Connector Panel	-0	rdaflash	-program	io62cp-0

4. Perform a system shutdown by typing `poweroff`

5. When "**Power down**" is displayed, turn power off with power switch on lower right of front panel.

This completes the FPGA software installation.

2.9.3 Reboot Power-up Check and RDA Diagnostics

After you have completed the installation steps above, reboot the unit. You can observe the progress of the reboot on the monitor. The front panel LED display shows the time of the reboot and display diagnostic messages. The complete reboot takes about 1 minute.

After the reboot is complete:

1. Login as **operator.**
2. Right-click to start a terminal window.
3. Stop the rvp8 (or rcp8) process by typing:

   ```
   $ killall rvp8 (or rcp8)
   ```

4. Run the following diagnostics and observe the results:

   ```
   (for RVP8 and RCP8 systems)
   $ rdadiags io62-0  tests I/O-62
   $ rdadiags io62cp-0  tests connector panel.
                        Requires test cable
   (for RVP8 systems only)
   $ rdadiags rvp8rx-0
   ```

5. Run the diagnostics for any optional RVP8 cards such as:

   ```
   $ rdadiags rvp8tx-0 tests RVP8/Tx
   $ rdadiags rvp8rx-1 tests 2nd RVP8/Rx
   ```

6. Restart the RVP8 or RCP8 process by typing (for the RVP8 example):

   ```
   $ rvp8 & or rcp8 &
   ```

7. Verify that the restart messages show no faults.

2.10 RVP9 (RDA) Software Installation

If you have installed or upgraded the RDA software, you must update the firmware running on RVP901 to be compatible with what was installed using sigconfig.

This procedure assumes that the second Ethernet port has been configured using the instructions in "Configuring the System and Network" on page 98.

1. Reboot the computer and log in as radarop.
2. If IRIS / RDA services are running, turn them off.
   a. Use ps_iris to check what is running.

      # ps_iris

   b. If there are Services are running, stop them.
      - For Centos6, use service:

        # service iris stop

        # service rvp900 stop

        # service rcp8 stop

        # service dspexport stop

        # service antennad stop

      - For Centos7, use systemctl:

        # systemctl stop iris

        # systemctl stop rvp900

        # systemctl stop rcp8

        # systemctl stop dspexport

        # systemctl stop antennad

3. Verify all services have stopped.

   # ps_iris

   o If there are services running, stop them using the systemctl / service commands or manually kill them. You must be logged in as root to use the kill command.

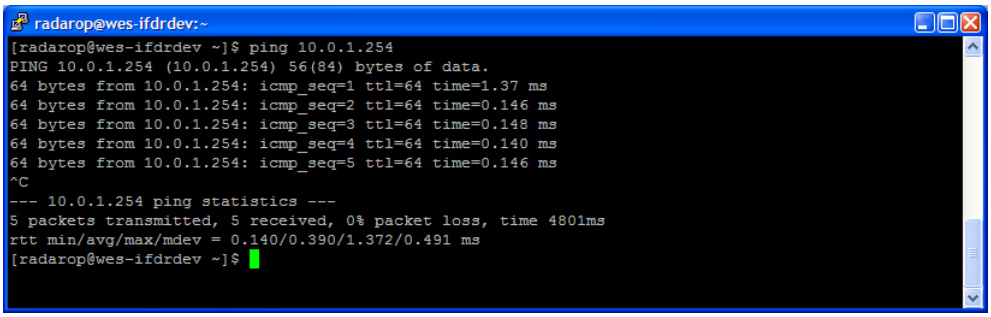
   # su

kill <process ID number>

4. If not powered, power on RVP901 (RVP9IFDR) and wait for it to boot. When booted D7 shows a flashing red light and a solid green light.
5. If the network cable is not attached, attach RVP901 (RVP9IFDR) to the second Ethernet connection configured for the 10.0.1.x network.
6. Verify that RVP901 (RVP9IFDR) is accessible over Ethernet.

   Run ping letting at least 4 packets transmit and Ctrl-C to exit program. Verify that there is 0% packet loss.

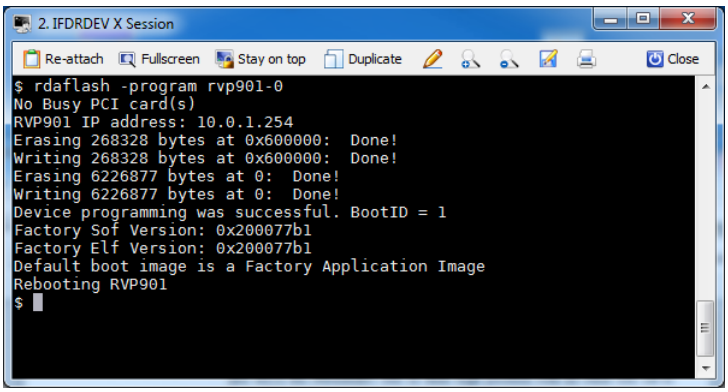
   # ping 10.0.1.254



7. Use the rdaflash utility to update the firmware on RVP901.

   This takes several minutes. Do not interrupt programming.

WARNING When programming starts, do not power cycle or reboot RVP90x until RDAFLASH is successfully complete.



When the programming is complete, RVP901 reboots. When the boot process is complete, the red light on D7 is blinks and the green light on D7 is solid.

8. Reboot the computer and login as radarop
9. Verify that the expected process are running with the ps_iris command.

   # ps_iris

2.11 RDA Software Configuration

After the receiving your unit from the factory, or after software re–installation, there are several configuration steps required to customize your system for your particular environment and application. The configuration tools available for this are summarized in the table below.

Configuration Tool	RDA Device	Description of Configuration Features
setup/RVP utility `setup_dsp.conf`	RVP8 RVP900	Configures the local environment required to run RVP8 the support utilities such as **ascope** and **dspx.** Examples include radar equation parameters that are required for calibration, pulse width definitions and PRF request limits.
setup/RCP utility `setup_ant.conf`	RCP8	Configures the local environment required to run the RCP8 support **utilities that such as antenna or bitex**. Examples include, max allowed AZ/EL velocity request, MIN and MAX elevation angles that can be requested and LAT/LON of radar for sun tracking.

Configuration Tool	RDA Device	Description of Configuration Features

RVP8 NV setups
RVP900 NV setups
`rvp8.conf`
`rvp9.conf`
	RVP8
	RVP900
		Defines the details of the sampling and processing algorithms as well as the operational configuration of the system. Examples include, IF filter design and selection, PRF limits, relative trigger timing, dual polarization features.

RCP8 NV setups `rcp8.conf`	RCP8	Used to configure which status and control bits are available and define the antenna servo control parameters. Examples include, physical or virtual tachometer selection, shutdown safety criteria and internal antenna simulator on/off.
`softplane.conf`	RVP8 RVP900 RCP8	File that is edited which defines the various I/O signals on the I/O-62 connector panel, pin-by-pin. For example, whether a line is an input or output, electrical spec such as RS422 or TTL, what local variable name is associated with each line.

NOTE Important: Both the setup utility and the TTY setups must be configured to customize your system. This is part of the installation procedure.

All of the configuration results are stored as ASCII text *.conf* files, typically in a directory called */usr/sigmet/* (factory default). The file names are indicated in the table above. Each file has a factory default configuration file that is stored in the template directory (the default is*/usr/sigmet/config_template/init/)*. An advantage of this approach is that for a radar network with identical hardware, configuration maintenance can be performed by copying pre-tested files over the network.

The following serve as references and are not repeated here:

- setup utility—*IRIS Utilities Manual*
- RVP8 NV setups—*RVP8 User's Manual*

- RVP900 NV setups—*RVP900 User's Manual*
- RCP8 NV setups—*RCP8 User's Manual*

An overview of these setups for both the RVP8 and RCP8 is provided in the next two sections, followed by a description of the softplane.conf file and its configuration.

2.11.1 RCP8 Setup Configuration Summary

The table below summarizes the setups required for the RCP8 and its associated host computer (if any). The three cases are summarized in the *RCP8 User's Manual*.

	Case 1: Serial Interface	**Case 2: Combined RCP8/RCW**	**Case 3: Socket Interface**
RCP8 TTY Setups: Site Host section			
Serial port	/dev/ttyS0 (e.g.)	.../fifo_hostio-x See note	.../fifo_hostio-x See note
Baud rate for host computer I/O	9600	*–Ignored–*	*–Ignored–*
RCP8 Setup: RCP Section			
System has an antenna	Yes	Yes	Yes
Interface Type	Native	Serial	Serial
Main channel device name	Not displayed for interface type Native	.../fifo_hostio-y See note	.../fifo_hostio-y See note
running at		*–Ignored–*	*–Ignored–*
with parity		*–Ignored–*	*–Ignored–*
Antenna angle insertion source	Native RCP8	Normal serial	Normal serial
AntExport Running on RCP8	*No*	*No*	*Yes*

	Case 1: Serial Interface	Case 2: Combined RCP8/RCW	Case 3: Socket Interface
Host RCW Setup Utility: RCP (e.g., running IRIS/Radar)			
System has an antenna	Yes	NA	
Interface Type	Serial		
Main channel device name	/dev/ttyS0/ (e.g.)		
running at	9600		
with parity	No		
Antenna angle insertion source	Normal Serial		

NOTE The recommended full path for the fifo interface is */usr/sigmet/config/fifo_hostio-x*. The other one (it does not matter which) is at */usr/sigmet/config/fifo_hostio-y.*

For Case 3: AntExport Receiving Workstation	
System has an antenna	Yes
Interface Type	Socket
AntExport hostname/IP-Address	*<for source node running AntExport>*
AntExport Port Number	30745

2.11.2 RVP8 Setup Configuration Summary

The table below summarizes the setups required for the RVP8 and its connection to the associated host radar control workstation (RCW). Refer to the *RVP8 User's Manual*.

Table 2 RVP8 Local Setups: TTY Setups and Setup Utility

<table>
<tr><td colspan="4">RVP8 TTY Setups</td></tr>
<tr><td rowspan="3">"Mc" Live angle input Antenna angles from RVP8 Az/El S/D inputs Antenna angles from other source (e.g., serial input)</td><td>Antenna angles from RVP8 Az/El TTL inputs</td><td></td><td>2: Tags</td></tr>
<tr><td colspan="3">3: S/D</td></tr>
<tr><td colspan="3">1: None</td></tr>
<tr><td>"Mt N" Range Mask spacing</td><td colspan="3" rowspan="3">These are all forced by the corresponding settings in the RVP8 Setup Utility: RVP Section (See Below)</td></tr>
<tr><td>"Mt N" Maximum number of Pulses/Sec</td></tr>
<tr><td>"Mt N" Maximum instantaneous PRF</td></tr>
<tr><td colspan="4">RVP8 Setup Utility: RVP Section</td></tr>
<tr><td>System has a signal processor</td><td colspan="3">Yes</td></tr>
<tr><td>Interface Type</td><td colspan="3">Native</td></tr>
<tr><td>Range Mask spacing</td><td>Default is 125 m</td><td rowspan="3">Configuring these fields also sets the corresponding fields in the RVP8 TTY Setups (See above)</td><td></td></tr>
<tr><td>Minimum PRF</td><td>As required</td><td></td></tr>
<tr><td>Maximum PRF</td><td>As required for max duty cycle</td><td></td></tr>
<tr><td colspan="3">RVP8 Setup Utility: RCP Section</td><td></td></tr>
<tr><td>Response to Mc Live angle input (above)</td><td>TTL binary angles or S/D</td><td colspan="2">"None"</td></tr>
<tr><td>System has an antenna</td><td>Yes</td><td colspan="2">Yes</td></tr>
</table>

Table 2 RVP8 Local Setups: TTY Setups and Setup Utility

Interface Type	Not applicable when Antenna angle insertion source is set to RVP8	Serial
Main channel device name		Default: /dev/ttyS0
running at		Default: 9600
with parity		None
Antenna angle insertion source	Native RVP8	Normal serial
DspExport Running on RVP8	Yes	Yes

Table 3 Setup Utility on RCW (Radar Control Workstation) running IRIS

IRIS Host RCW Setup Utility: RVP Section		
System has a signal processor	Yes	
Interface Type	Socket	
DspExport hostname/IP–Address	*<hostname or IP address of RVP8>*	
DspExport Port Number	Default: 30740	
IRIS Host RCW Setup Utility: Ingest Section		
Response to Mc Live angle input (above)	TTL binary angles or S/D	"None"
Manner of angle acquisition	Binary TAGS	Serial Stream

2.11.3 Configuring the softplane.conf File

2.11.3.1 What is the softplane.conf File?

The softplane.conf file is used to define pin–by–pin assignment of I/O functions to various connectors on the I/O-62 connector panel. It is a plain text ASCII file that is self-documented. Since the RVP8 and RCP8 have virtually no jumpers, or wirewrap, all I/O configuration on the I/O-62 connector panel is done by software approach according to this file.

2.11.3.2 Where is softplane.conf?

The file resides in the IRIS_CONFIG directory. Typically this is */usr/sigmet/config* (this is the default directory that is factory installed). The factory configurations are also available in the */usr/sigmet/template/init* directory so that you can always return to the factory defaults if you need to.

2.11.3.3 When do I Need to Change softplane.conf?

The softplane.conf file that is shipped with your system is configured for a standard connector panel with I/O as described in the *RCP8 User's Manual*. As long as you use the standard I/O pin assignments, then you do not need to change softplane.conf.

If you need to redefine some of the I/O pins on the connector panel, or add additional Vaisala cards such as a second I/O-62 then you must change softplane.conf.

2.11.3.3.1 Editing he Softplane.conf File

You need to use a text editor to modify the softplane.conf file. There are several editors included in the system:

- **vi** —the generic UNIX editor that is available on every UNIX system. It is really arcane to use, but many people know how to use it out of necessity or they are simply used to it now.
- **gedit**—this is more user friendly with keyboard commands and mouse support when you are in X–Windows so it a little easier to learn than **vi**.

To start an editing session you would do the following as **operator:**

```
$ cd /usr/sigmet/config

$ gedit softplane.conf
```

or

```
$ vi softplane.conf
```

2.11.3.3.2 Softplane.conf File: RVP8 Example

An example from the beginning and some excerpts from the softplane.conf file are shown below (note that the command "**cat**" causes the file to be listed on a terminal):

```
cat /usr/sigmet/config/softplane.conf
```

```
Softplane Configuration File
```

The following general purpose control and status signals can be routed to/from any available hardware pin. The '~' prefix character may be used for signal inversion.

Control Outputs	Status Inputs
cPedAZ[15:0]	sPedAZ[15:0]
cPedEL[15:0]	sPedEL[15:0]
cEarthAZ[15:0]	sServoPwr
cEarthEL[15:0]	sLocal
cServoPwr	sStandby
cCabinetRelay	sLowerEL
cTransmitPwr	sUpperEL
cPWidth[3:0]	sTransmitPwr
cTrigBlank	sTransmitLocal
cRadiateOn	sPWidth[3:0]
cRadiateOff	sTrigBlank
cReset	sRadiate
cIrisMode[2:0]	sAirflowFlt
cAux[63:0	sWavegpFlt
true	sInterlockFlt
false	sMagCurrentFlt
	sReset
	sIrisMode[2:0]
	sAux[319:0]

```
splConfig.sVersion = "7.32"
# ------------------- IO62 Slot #0 -------------------
#
splConfig.Io62[0].lInUse = 1
# The remote backpanel type should be one of the following:
# Direct : Direct I/O with IO62 connector itself
# IO62CP : Standard IO62-CP connector panel
# RVP88D : RVP8 portion of WSR88D panel
# RCP88D : RCP8 portion of WSR88D panel
#
splConfig.Io62[1].sExtPanel = "IO62CP"
# TTL/CMOS on J1
#
splConfig.Io62[0].Opt.Cp.J1.pin01 = "sPedAZ[0]"
```

```
splConfig.Io62[0].Opt.Cp.J1.pin02 = "sPedAZ[1]"
splConfig.Io62[0].Opt.Cp.J1.pin03 = "sPedAZ[2]"
...
# Relays and relay drivers on J6
#
splConfig.Io62[0].Opt.Cp.J6_IntRelay1 = ""
splConfig.Io62[0].Opt.Cp.J6_IntRelay2 = ""
splConfig.Io62[0].Opt.Cp.J6_IntRelay3 = ""
splConfig.Io62[0].Opt.Cp.J6_ExtRelay1 = ""
splConfig.Io62[0].Opt.Cp.J6_ExtRelay2 = ""
splConfig.Io62[0].Opt.Cp.J6_ExtRelay3 = ""
splConfig.Io62[0].Opt.Cp.J6_ExtRelay4 = ""
# BNC testpoint monitors
#
splConfig.Io62[0].Opt.Cp.J13_BNC = ""
splConfig.Io62[0].Opt.Cp.J16_BNC = ""
# BNC trigger drivers direct from IO62 PCI card.
# Special signals 'trigger[8:1]' may also be used here.
#
splConfig.Io62[0].Opt.Cp.J14_BNC = "trigger[1]"
splConfig.Io62[0].Opt.Cp.J15_BNC = "trigger[2]"
splConfig.Io62[0].Opt.Cp.J17_BNC = "trigger[3]"
splConfig.Io62[0].Opt.Cp.J18_BNC = "trigger[4]"
# RS232 TTY transmitters from IO62
#
splConfig.Io62[0].Opt.Cp.TTY0_Tx = ""
splConfig.Io62[0].Opt.Cp.TTY1_Tx = ""
# ------------------- IO62 Slot #1 -------------------
#
splConfig.Io62[1].lInUse = 0
# ------------------- IO62 Slot #2 -------------------
#
splConfig.Io62[2].lInUse = 0
....
# <End of softplane definitions>
```

2.11.3.3.3 Softplane.conf File: RVP900 Common Panel Example

An example showing RVP900 IFDR related excerpts from the softplane.conf file are shown below:

```
#
#
# Softplane Configuration File
#
# The following general purpose control and status signals:
#
...
# -------------------- RVP9IFD #0 --------------------
```

```
#
# If you change the in-use flag, run 'softplane -resave' to
rev the choices.
#
splConfig.Rvp9[0].lInUse = 1
# The remote backpanel type must be one of the following:
#    Common : Direct connections using the 'Common I/O'
model
#    TDWR : MIT/LL TDWR custom breakout panel and protocols
# If you change this, run 'softplane -resave' to rev the
choices.
#
splConfig.Rvp9[0].sNetPanel = "Common"
# In addition to all of the standard logical signals, the
# following realtime 'live' signals may be assigned to any
# of the RVP9 interface pins under the Common I/O model.
#
# Control Outputs  Status Inputs
# ---------------  -------------
# tgBlanked        tgBlankReq
# trigger[10:1]    tgExtern
# txPolar[2:1]
# txPhase[7:0]
# DAFCser
spl#

splConfig.Rvp9[0].Opt.Comm.ttl[0].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[1].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[2].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[3].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[4].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[5].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[6].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[7].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[8].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[9].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[10].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[11].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[12].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[13].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[14].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[15].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[16].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[17].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[18].pin = ""
splConfig.Rvp9[0].Opt.Comm.ttl[19].pin = ""
splConfig.Rvp9[0].Opt.Comm.diff[0].pin = ""
splConfig.Rvp9[0].Opt.Comm.diff[1].pin = ""
splConfig.Rvp9[0].Opt.Comm.diff[2].pin = ""
splConfig.Rvp9[0].Opt.Comm.diff[3].pin = ""
splConfig.Rvp9[0].Opt.Comm.diff[4].pin = ""
splConfig.Rvp9[0].Opt.Comm.diff[5].pin = ""
splConfig.Rvp9[0].Opt.Comm.diff[6].pin = ""
```

```
splConfig.Rvp9[0].Opt.Comm.diff[7].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[8].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[9].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[10].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[11].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[12].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[13].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[14].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[15].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[16].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[17].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[18].pin = ”“
splConfig.Rvp9[0].Opt.Comm.diff[19].pin = ”“

splConfig.Rvp9[0].Opt.Comm.trig[0].pin = ”trigger[1]”
splConfig.Rvp9[0].Opt.Comm.trig[1].pin = ”trigger[2]”
# Voltage samples from the six low-speed A/D converters are
# requested here. These produce additional I/O overhead, so
# put a ’1’ here only if the samples are actually being
used.
#
splConfig.Rvp9[0].Opt.Comm.lInUseADC = 0
```

2.11.3.3.4 Softplane.conf File: RVP900 TDWR Panel Example

An example showing RVP900 IFDR related excerpts from the softplane.conf file are shown below:

```
#
#
# Softplane Configuration File
#
# The following general purpose control and status signals:
#
...
# -------------------- RVP9IFD #0 --------------------
#
# If you change the in-use flag, run ’softplane -resave’ to
rev the choices.
#
splConfig.Rvp9[0].lInUse = 1
# The remote backpanel type must be one of the following:
#    Common : Direct connections using the ’Common I/O’
model
#    TDWR : MIT/LL TDWR custom breakout panel and protocols
# If you change this, run ’softplane -resave’ to rev the
choices.
#
splConfig.Rvp9[0].sNetPanel = ”TDWR”

softplane.conf file: RCP8 example
```

An example from the beginning and some excerpts from the softplane.conf file are shown below (note that the command "**cat**" causes the file to be listed on a terminal):

```
Softplane
Configuration File
```

```
The following general purpose control and status signals
can be routed to/from any available hardware pin. The '~'
prefix character may be used for signal inversion.
```

Control Outputs	Status Inputs
cPedAZ[15:0]	sPedAZ[15:0]
cPedEL[15:0]	sPedEL[15:0]
cEarthAZ[15:0]	sServoPwr
cEarthEL[15:0]	sLocal
cServoPwr	sStandby
cCabinetRelay	sLowerEL
cTransmitPwr	sUpperEL
cPWidth[3:0]	sTransmitPwr
cTrigBlank	sTransmitLocal
cRadiateOn	sPWidth[3:0]
cRadiateOff	sTrigBlank
cReset	sRadiate
cIrisMode[2:0]	sAirflowFlt
cAux[80:0]	sWavegpFlt
true	sInterlockFlt
false	sMagCurrentFlt
	sReset
	sIrisMode[2:0]

```
sAux[319:0]splConfig.sVersion = "8.00"
# ------------------- IO62 Slot #0 -------------------
#
splConfig.Io62[0].lInUse = 1
# The remote backpanel type should be one of the following:
# Direct : Direct I/O with IO62 connector itself
# IO62CP : Standard IO62-CP connector panel
# RCP88D : RCP8 portion of WSR88D panel
# RVP88D : RVP8 portion of WSR88D panel
#
splConfig.Io62[0].sExtPanel = "IO62CP"# TTL/CMOS on J1
#
```

```
splConfig.Io62[0].Opt.Cp.J1.pin01 = "sPedAZ[0]"
splConfig.Io62[0].Opt.Cp.J1.pin02 = "sPedAZ[1]"
splConfig.Io62[0].Opt.Cp.J1.pin03 = "sPedAZ[2]"
splConfig.Io62[0].Opt.Cp.J1.pin04 = "sPedAZ[3]"
splConfig.Io62[0].Opt.Cp.J1.pin05 = "sPedAZ[4]"
splConfig.Io62[0].Opt.Cp.J1.pin06 = "sPedAZ[5]"
splConfig.Io62[0].Opt.Cp.J1.pin07 = "sPedAZ[6]"
splConfig.Io62[0].Opt.Cp.J1.pin08 = "sPedAZ[7]"
splConfig.Io62[0].Opt.Cp.J1.pin09 = "sPedAZ[8]"
splConfig.Io62[0].Opt.Cp.J1.pin10 = "sPedAZ[9]"
splConfig.Io62[0].Opt.Cp.J1.pin11 = "sPedAZ[10]"
splConfig.Io62[0].Opt.Cp.J1.pin12 = "sPedAZ[11]"
splConfig.Io62[0].Opt.Cp.J1.pin13 = "sPedAZ[12]"
splConfig.Io62[0].Opt.Cp.J1.pin14 = "sPedAZ[13]"
splConfig.Io62[0].Opt.Cp.J1.pin15 = "sPedAZ[14]"
splConfig.Io62[0].Opt.Cp.J1.pin16 = "sPedAZ[15]"
splConfig.Io62[0].Opt.Cp.J1.pin17 = ""
splConfig.Io62[0].Opt.Cp.J1.pin18 = ""
splConfig.Io62[0].Opt.Cp.J1.pin19 = ""
splConfig.Io62[0].Opt.Cp.J1.pin20 = ""# TTL/CMOS on J2
#
splConfig.Io62[0].Opt.Cp.J2.pin01 = "cEarthAZ[0]"
splConfig.Io62[0].Opt.Cp.J2.pin02 = "cEarthAZ[1]"
splConfig.Io62[0].Opt.Cp.J2.pin03 = "cEarthAZ[2]"
. . .
splConfig.Io62[0].Opt.Cp.J2.pin15 = "cEarthAZ[14]"
splConfig.Io62[0].Opt.Cp.J2.pin16 = "cEarthAZ[15]"
splConfig.Io62[0].Opt.Cp.J2.pin17 = ""
splConfig.Io62[0].Opt.Cp.J2.pin18 = ""
splConfig.Io62[0].Opt.Cp.J2.pin19 = ""
splConfig.Io62[0].Opt.Cp.J2.pin20 = ""# TTL/CMOS on J4
#
splConfig.Io62[0].Opt.Cp.J4.pin01 = "sPedEL[0]"
splConfig.Io62[0].Opt.Cp.J4.pin02 = "sPedEL[1]"
splConfig.Io62[0].Opt.Cp.J4.pin03 = "sPedEL[2]"
. . .
splConfig.Io62[0].Opt.Cp.J4.pin15 = "sPedEL[14]"
splConfig.Io62[0].Opt.Cp.J4.pin16 = "sPedEL[15]"
splConfig.Io62[0].Opt.Cp.J4.pin17 = ""
splConfig.Io62[0].Opt.Cp.J4.pin18 = ""
splConfig.Io62[0].Opt.Cp.J4.pin19 = ""
splConfig.Io62[0].Opt.Cp.J4.pin20 = ""# TTL/CMOS on J5
#
splConfig.Io62[0].Opt.Cp.J5.pin01 = "cEarthEL[0]"
splConfig.Io62[0].Opt.Cp.J5.pin02 = "cEarthEL[1]"
splConfig.Io62[0].Opt.Cp.J5.pin03 = "cEarthEL[2]"
. . .
splConfig.Io62[0].Opt.Cp.J5.pin15 = "cEarthEL[14]"
splConfig.Io62[0].Opt.Cp.J5.pin16 = "cEarthEL[15]"
```

```
splConfig.Io62[0].Opt.Cp.J5.pin17 = ""
splConfig.Io62[0].Opt.Cp.J5.pin18 = ""
splConfig.Io62[0].Opt.Cp.J5.pin19 = ""
splConfig.Io62[0].Opt.Cp.J5.pin20 = ""# TTL/CMOS on J7
#
splConfig.Io62[0].Opt.Cp.J7.pin01 = "sAux[0]"
splConfig.Io62[0].Opt.Cp.J7.pin02 = "sAux[1]"
splConfig.Io62[0].Opt.Cp.J7.pin03 = "sAux[2]"
splConfig.Io62[0].Opt.Cp.J7.pin04 = "sAux[3]"
splConfig.Io62[0].Opt.Cp.J7.pin05 = "sAux[4]"
splConfig.Io62[0].Opt.Cp.J7.pin06 = "sAux[5]"
splConfig.Io62[0].Opt.Cp.J7.pin07 = "sAux[6]"
splConfig.Io62[0].Opt.Cp.J7.pin08 = "sAux[7]"
splConfig.Io62[0].Opt.Cp.J7.pin09 = "sAux[8]"
splConfig.Io62[0].Opt.Cp.J7.pin10 = "sAux[9]"
splConfig.Io62[0].Opt.Cp.J7.pin11 = "sAux[10]"
splConfig.Io62[0].Opt.Cp.J7.pin12 = "sAux[11]"
splConfig.Io62[0].Opt.Cp.J7.pin13 = "sAux[12]"
splConfig.Io62[0].Opt.Cp.J7.pin14 = "sAux[13]"
splConfig.Io62[0].Opt.Cp.J7.pin15 = "sAux[14]"
splConfig.Io62[0].Opt.Cp.J7.pin16 = "sAux[15]"
splConfig.Io62[0].Opt.Cp.J7.pin17 = "sAux[16]"
splConfig.Io62[0].Opt.Cp.J7.pin18 = "sAux[17]"
splConfig.Io62[0].Opt.Cp.J7.pin19 = "sAux[18]"
splConfig.Io62[0].Opt.Cp.J7.pin20 = "sAux[19]"
#
# Eight IO62 line pairs on J3
#
splConfig.Io62[0].Opt.Cp.J3_01_14.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_01_14.iTerm = 0
splConfig.Io62[0].Opt.Cp.J3_01_14.pinPos = "cPWidth[0]"
splConfig.Io62[0].Opt.Cp.J3_01_14.pinNeg = "cPWidth[1]"
splConfig.Io62[0].Opt.Cp.J3_02_15.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_02_15.iTerm = 0
splConfig.Io62[0].Opt.Cp.J3_02_15.pinPos = "cRadiateOn"
splConfig.Io62[0].Opt.Cp.J3_02_15.pinNeg = "cRadiateOff"
splConfig.Io62[0].Opt.Cp.J3_03_16.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_03_16.iTerm = 0
splConfig.Io62[0].Opt.Cp.J3_03_16.pinPos = "cServoPwr"
splConfig.Io62[0].Opt.Cp.J3_03_16.pinNeg = "cTransmitPwr"
splConfig.Io62[0].Opt.Cp.J3_04_17.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_04_17.iTerm = 0
splConfig.Io62[0].Opt.Cp.J3_04_17.pinPos = "cReset"
splConfig.Io62[0].Opt.Cp.J3_04_17.pinNeg = ""
splConfig.Io62[0].Opt.Cp.J3_05_18.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_05_18.iTerm = 1
splConfig.Io62[0].Opt.Cp.J3_05_18.pinPos = "sPWidth[0]"
splConfig.Io62[0].Opt.Cp.J3_05_18.pinNeg = "sPWidth[1]"
splConfig.Io62[0].Opt.Cp.J3_06_19.lRS422 = 0
```

```
splConfig.Io62[0].Opt.Cp.J3_06_19.iTerm = 1
splConfig.Io62[0].Opt.Cp.J3_06_19.pinPos = "sRadiate"
splConfig.Io62[0].Opt.Cp.J3_06_19.pinNeg = ""
splConfig.Io62[0].Opt.Cp.J3_07_20.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_07_20.iTerm = 1
splConfig.Io62[0].Opt.Cp.J3_07_20.pinPos = "sServoPwr"
splConfig.Io62[0].Opt.Cp.J3_07_20.pinNeg = "sTransmitPwr"
splConfig.Io62[0].Opt.Cp.J3_08_21.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_08_21.iTerm = 1
splConfig.Io62[0].Opt.Cp.J3_08_21.pinPos = "sReset"
splConfig.Io62[0].Opt.Cp.J3_08_21.pinNeg = ""
# Two RS-422 Tx/Rx chips on J3
#
splConfig.Io62[0].Opt.Cp.J3_09_22 = ""
splConfig.Io62[0].Opt.Cp.J3_10_23 = ""
# Seven IO62 line pairs on J9
#
splConfig.Io62[0].Opt.Cp.J9_01_14.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_01_14.iTerm = 1
splConfig.Io62[0].Opt.Cp.J9_01_14.pinPos = "sWavegpFlt"
splConfig.Io62[0].Opt.Cp.J9_01_14.pinNeg = "sAirflowFlt"
splConfig.Io62[0].Opt.Cp.J9_02_15.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_02_15.iTerm = 1
splConfig.Io62[0].Opt.Cp.J9_02_15.pinPos = "sInterlockFlt"
splConfig.Io62[0].Opt.Cp.J9_02_15.pinNeg = "sMagCurrentFlt"
splConfig.Io62[0].Opt.Cp.J9_03_16.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_03_16.iTerm = 1
splConfig.Io62[0].Opt.Cp.J9_03_16.pinPos = "sLocal"
splConfig.Io62[0].Opt.Cp.J9_03_16.pinNeg = "sStandby"
splConfig.Io62[0].Opt.Cp.J9_04_17.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_04_17.iTerm = 1
splConfig.Io62[0].Opt.Cp.J9_04_17.pinPos = "sLowerEL"
splConfig.Io62[0].Opt.Cp.J9_04_17.pinNeg = "sUpperEL"
splConfig.Io62[0].Opt.Cp.J9_05_18.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_05_18.iTerm = 0
splConfig.Io62[0].Opt.Cp.J9_05_18.pinPos = ""
splConfig.Io62[0].Opt.Cp.J9_05_18.pinNeg = ""
splConfig.Io62[0].Opt.Cp.J9_06_19.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_06_19.iTerm = 0
splConfig.Io62[0].Opt.Cp.J9_06_19.pinPos = ""
splConfig.Io62[0].Opt.Cp.J9_06_19.pinNeg = ""
splConfig.Io62[0].Opt.Cp.J9_07_20.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_07_20.iTerm = 0
splConfig.Io62[0].Opt.Cp.J9_07_20.pinPos = ""
splConfig.Io62[0].Opt.Cp.J9_07_20.pinNeg = ""
# Relays and relay drivers on J6
#
splConfig.Io62[0].Opt.Cp.J6_IntRelay1 = "cPWidth[0]"
splConfig.Io62[0].Opt.Cp.J6_IntRelay2 = "cPWidth[1]"
```

```
splConfig.Io62[0].Opt.Cp.J6_IntRelay3 = ""
splConfig.Io62[0].Opt.Cp.J6_ExtRelay1 = ""
splConfig.Io62[0].Opt.Cp.J6_ExtRelay2 = ""
splConfig.Io62[0].Opt.Cp.J6_ExtRelay3 = ""
splConfig.Io62[0].Opt.Cp.J6_ExtRelay4 = ""
# BNC testpoint monitors
#
splConfig.Io62[0].Opt.Cp.J13_BNC = ""
splConfig.Io62[0].Opt.Cp.J16_BNC = ""
# BNC trigger drivers direct from IO62 PCI card.
# Special signals 'trigger[8:1]' may also be used here.
#
splConfig.Io62[0].Opt.Cp.J14_BNC = ""
splConfig.Io62[0].Opt.Cp.J15_BNC = ""
splConfig.Io62[0].Opt.Cp.J17_BNC = ""
splConfig.Io62[0].Opt.Cp.J18_BNC = ""
# RS232 TTY transmitters/Receivers from IO62
#
splConfig.Io62[0].Opt.Cp.TTY0_Tx = ""
splConfig.Io62[0].Opt.Cp.TTY1_Tx = ""
splConfig.Io62[0].Opt.Cp.TTY0_Rx = ""
splConfig.Io62[0].Opt.Cp.TTY1_Rx = ""
# ------------------- IO62 Slot #1 -------------------
#
splConfig.Io62[1].lInUse = 0
# ------------------- IO62 Slot #2 -------------------
#
splConfig.Io62[2].lInUse = 0
# ------------------ IO62 Slot #3 -------------------
#
splConfig.Io62[3].lInUse = 0
```

2.11.3.3.5 Softplane. conf Organization and Syntax

The softplane.conf file is used to define every I/O pin on every connector, on the PCI cards themselves and on the connector panel. There are two primary definitions that are made for each pin:

- **Physical Interface—** the electrical properties (RS422 output, analog input, TTL output, etc.).
- **Logical Interface**-—the internal variable name that is associated with each pin.

The syntax of the file is:

- "#" at the beginning of a line indicates a comment. These are used for internal documentation and if you make changes you should comment them, for example:

```
# TTL I/O on J7
#
# Modification by REP on 2 Apr 03
# Added new interlock input on connector panel J7 pin07
...
```

- The top part of the file provides a list of internal variables names that are used to define the logical interface to the softplane. These are divided into status inputs (also called indicators) and control outputs (also called requests). For example, sPedAZ0 corresponds to the LSB of a digital azimuth angle relative to the antenna pedestal. The tables on the next page provide a summary of the available status and control variable names.

NOTE	Important: This table is subject to change

- Each definition line in the file starts with the keyword text:

  ```
  # splConfig...
  ```

- The first un-commented line of the file indicates the version of the IRIS support software that was last used to machine–generate the file. This is an information only field for traceability purposes and is thus not edited. In the example we have this shown as:

  ```
  # splConfig.sVersion = "7.32"
  ```

On the TTL connectors (J1, J2, J4, J5, J7), each connector must be exclusively used for INPUT (s vars) or OUTPUT (c vars). You can not mix these on an individual connector.

Table 4 Summary of softplane.conf Status and Control Bits

Control Output	Meaning/Interpretation
`cPedAZ[15:0]`	16 bits of antenna azimuth angle relative to the pedestal (fixed base system)
`cPedEL[15:0]`	16 bits of antenna elevation angle relative to the pedestal (fixed base system)
`cEarthAZ[15:0]`	16 bits of antenna azimuth angle relative to the earth (moving platform)
`cEarthEL[15:0]`	16 bits of antenna elevation angle relative to the earth (moving platform)
`cServoPwr`	To control servo power on
`cCabinetRelay`	To control a relay signal
`cTransmitPwr`	Request transmit power on
`cPWidth[3:0]`	Request one of four pulse widths
`cTrigBlank`	Trigger blanking signal
`cRadiateOn`	Request radiate on
`cRadiateOff`	Request for radiate off
`cReset`	Request a reset of external equipment
`cIrisMode[2:0]`	Request the application software (e.g., IRIS) to switch to 1 of 8 operating modes.
`cAux[63:0]`	Arbitrarily assigned output requests
`true`	Internal logic variable
`false`	Internal logic variable

Status Input	Meaning/Interpretation
`sPedAZ[15:0]`	16 bits of antenna azimuth angle relative to the pedestal (fixed base system)
`sPedEL[15:0]`	16 bits of antenna elevation angle relative to the pedestal (fixed base system)
`sServoPwr`	Servo power on indicator
`sLocal`	Antenna local mode indicator, usually tied to an external local/remote switch.
`sStandby`	Radar ready to radiate indicator
`sLowerEL`	Lower limit switch indicator
`sUpperEL`	Upper limit switch indicator

Status Input	Meaning/Interpretation
sTransmitPwr	Transmitter cabinet power on indicator
sTransmitLocal	Transmitter local mode indicator, usually tied to an external local/remote switch.
sPWidth[3:0]	Indicator of the current pulse width
sTrigBlank	Indicator that trigger blanking is requested, usually from an external source.
sRadiate	Radiate on indicator
sAirflowFlt	Cooling airflow fault indicator
sWavegpFlt	Wave guide pressure fault indicator
sInterlockFlt	Master interlock fault indicator
sMagCurrentFlt	Transmitter overload fault indicator
sReset	Request for reset coming from external source
sIrisMode[2:0]	Information on which operating mode is active in the application software
sAux[319:0]	Arbitrary status indicators

- Next, each piece of hardware is identified as being either in use or not in use.

  ```
  splConfig.Io62[0].InUse = 1 if in use
  splConfig.Io62[0].InUse = 0 if unused or not installed
  ```

  Currently, the I/O-62 is the only I/O device supported by the softplane.

- The method of connecting to the I/O-62 is specified next, for example:

  ```
  splConfig.Io62[0].sExtPanel = "DIRECT"
  ```

  Currently, the options are:

Type of Connection	softplane Descriptor
Direct connect to I/O-62 via 62 pin connector	DIRECT
I/O-62 Connector Panel (used for RVP8 and RCP8)	IO62CP
WSR88D connector panel, RVP8 portion	RVP88D
WSR88D connector panel, RCP8 portion	RCP88D

- The assignments for each connector and each pin are then made. For convenience, these are usually grouped together by connector. For

example let's say that, Pin 1 of connector J1 on the I/O-62 connector panel is assigned to be the LSB of the input azimuth angle, i.e.,

```
# TTL/CMOS on J1
#
splConfig.Io62[0].Opt.Cp.J1.pin01 = "sPedAZ[0]"
...
```

- The notation "" indicates that no assignment is made.

```
# BNC testpoint monitors
#
splConfig.Io62[0].Opt.Cp.J13_BNC = ""
```

  In the example above the "pin name" is J13_BNC.

- Putting a ~ in front of a logic variable inverts the variable.

```
splConfig.Io62[0].Opt.Cp.J1.pin03 = "~sPedAZ[2]"
```

Check in the */usr/sigmet/config_template/init* directory for other examples of softplane configurations.

2.12 Testing, Backup, and Calibration

After software installation and before calibration, check system performance and check for installation errors. If DSP calibrations are off, radar data may be unavailable.

2.12.1 Ascope Test (RVP8 Installations ONLY)

Run the ascope utility by typing `ascope`.

This serves as an overall test of the signal processor. See I*RIS and RDA Utilities Manual* for details.

If the displayed PRF does not match what is requested, the processor type may be set incorrectly. Be careful with high PRFs because the pulse width control may not be working yet.

2.12.2 Antenna Test (RCP Installations ONLY)

Run the Antenna utility by typing `antenna`.

You should be able to control the position and speed of the antenna as described in the *Utilities Manual*.

2.12.3 IRIS Test (IRIS systems ONLY)

Run IRIS and schedule a simple task that moves the antenna, runs the signal processor, and generates a PPI product.

Check for messages in the message menu. Normal startup should produce no messages.

2.12.4 Print Special Files

Because the system is customized during installation, Vaisala recommends you save your the work in case it needs to be repeated. To do so, print the Setup listing file generated by the `all` command.

2.12.5 Make a Full Backup

Backup your system on a regular basis. This is the only way to restore your disk if data are lost.

For HP systems follow the system backup procedures recommended by the manufacturers.

In addition, you can use the sigbru utility for auxiliary backup.

Linux users can use the backup procedure recommended by Red Hat or can use the sigbru utility for complete backup and restore. For information on sigbru, see Appendix E, sigbru Utility, on page 135.

2.12.6 DSP Calibration (RVP Installations ONLY)

Below is a list of the calibrations for the signal processor in the suggested order. Next to each is the name of the utility program that can help perform the calibration. How to perform each calibration is described in the *IRIS/RDA Utilities Manual*.

- Calibration of Reflectivity. (zauto)
- Calibration of the dual-pol LDR Offset. (suncal)
- Calibration of the dual-pol ZDR Offset. (zdrcal)

CHAPTER 3
UNIX SURVIVAL SKILLS

This chapter describes how to configure your UNIX system for running IRIS.

3.1 Running IRIS Utilities from a Remote Node

IRIS systems running on one node can run utilities from another node if the systems are set up properly. This is useful, for example, if you are doing diagnostics and need to run an IRIS utility on a remote system. You can log onto the remote system across the network and display the product output on your local workstation, as follows:

1. Enter the following command on your workstation to allow other nodes to display windows on it:

   ```
   $ xhost +
   ```

   This command must be entered by someone logged on directly to the system (not by someone who has done a remote login), and the command cannot be run from a login file. If this is impractical, create a file called */etc/X0.hosts* on the system. In the file, list the names of each of the nodes on the network that should be given access to the display of the system. For example, in a network consisting of three nodes "host", "prod", an "ws1", *etc/X0.hosts* would contain the following three entries:

   ```
   host
   prod
   ws1
   ```

   When the *etc/X0.hosts* file is present on a workstation, all nodes in the list are authorized to display windows on that workstation at any time. There is a bug in HPUX 10.20 which causes it to miss it's own node name from this file.

Under CDE, you can also configure this with a file in the */etc/td/config/Xsession.d* directory. Place commands like "xhost +host" in a file called 090xhost in this directory, set protection to 555, owner and group to bin. For just one user, place the command in the file *~/.dt/config/sessions/sessionetc.*

2. From the local workstation, log on to the remote system and set the display to the local workstation. For example, to log onto the `host` system from `prod`, type the following commands from the `prod system:`

```
$ rlogin host
$ DISPLAY=prod:0.0
$ export $DISPLAY
```

3. Run the IRIS utility from the remote system. All output from the utility is displayed on the local workstation
4. When you are done, exit from the utility, then log off of the remote system.

3.2 Managing an IRIS System

This section describes some commands provided by the UNIX operating system that you may find helpful in managing the IRIS system after it is installed. IRIS provides some commands for system management purposes, as well. These commands, described in Chapter 4, IRIS Diagnostic Utilities on page 71, are the same across all platforms.

3.2.1 Checking the IRIS Environment

If you have questions about the environment variables that are defined for your session, use the `env` and `grep` commands, as follows:

```
$ env | grep IRIS | sort
IRIS_ANTSIM=/dev/tty01
IRIS_APP_DEFAULTS=/usr/sigmet/bin/app-defaults/
IRIS_BIN=/usr/sigmet/bin/
IRIS_BIN_ACROBAT=/usr/sigmet/acrobat/bin/
IRIS_BITMAPS=/usr/sigmet/dt/icons/
IRIS_CONFIG=/usr/sigmet/config/
```

```
IRIS_DICTIONARY=/usr/sigmet/config/dict/

IRIS_INGEST=/usr/iris_data/ingest/

IRIS_INIT=/usr/sigmet/config/init/

IRIS_KEYS=/usr/sigmet/bin/keys/

IRIS_LOG=/usr/iris_data/log/

IRIS_MANUALS_INST=
/usr/sigjoe/manuals/IrisInstall.ilcab/instapdf/install/

IRIS_MANUALS_IRIS=
/usr/sigjoe/manuals/IrisUsers.ilcab/irisupdf/irisug/

IRIS_MANUALS_NOTE=
/usr/sigjoe/manuals/relnotes.ilcab/relnopdf/relnotes/

IRIS_MANUALS_PROG=
/usr/sigjoe/manuals/IrisProgram.ilcab/irisppdf/program/

IRIS_MANUALS_RCP02=
/usr/sigjoe/manuals/rcp02_ug.ilcab/rcp02pdf/rcp02/

IRIS_MANUALS_RVP6=
/usr/sigjoe/manuals/rvp6_ug.ilcab/rvp6updf/rvp6user/

IRIS_MANUALS_RVP7=
/usr/sigjoe/manuals/rvp7_ug.ilcab/rvp7updf/rvp7user/

IRIS_MANUALS_RXNET7=
/usr/sigjoe/manuals/rxnet7.ilcab/rxnetpdf/rxnet7/

IRIS_MANUALS_UTIL=
/usr/sigjoe/manuals/IrisUtils.ilcab/irisupdf/irisutl/

IRIS_MENU=/usr/sigmet/config/menu/

IRIS_NETRCV=TCPIP 30725

IRIS_NLS=/usr/sigmet/bin/nls/C/

IRIS_OBSERVERS=observer

IRIS_OPERATORS=joe alan doug operator rich

IRIS_OVERLAY=/usr/sigmet/config/overlay/

IRIS_PIPES=/usr/sigmet/config/pipes/

IRIS_PRODUCT=/usr/iris_data/product/

IRIS_PRODUCT_RAW=/usr/iris_data/product_raw/

IRIS_ROOT=/usr/sigmet
```

```
IRIS_SCRIPT=/usr/sigjoe/script/

IRIS_SOUNDS=/usr/sigjoe/dt/sounds/

IRIS_TAPE_INV=/usr/iris_data/tape_inv/

IRIS_TEMP=/usr/iris_data/temp/
```

Together, these commands return all the environment variables containing the string "IRIS." If you have some question whether your definitions are correct, compare the results of this command to the definitions in the file */config/profile*.

3.2.2 Reporting the Free Blocks on a Disk

IRIS is always gathering data, producing many ingest and product files. When there is not enough space for the new data coming in, the Watchdog process makes room for it, deleting the oldest files first. You need to make sure there is enough space allocated on the disk partition to hold at least three volume scans for the periodic configuration that IRIS is running.

The `df` command returns the number of free 512-byte blocks and free inodes available on each mounted disk, including disks mounted over the network. This command can tell you whether enough space is available for your data. For more information on these commands, type `man df`.

3.2.3 File Ownership and Protection

Sometimes there are problems after an installation with access to some of the SIGMET files. Typically, this is evidenced by an error message saying that the user does not have privilege to do an operation. This can happen when starting a program or when calibration files are accessed. If you should have this problem, log in as `root` and run the `install_iris` script as shown below:

```
# install_iris -setown
```

This procedure goes through the */usr/sigmet* directory tree, changing the owner of all files to `operator` and setting the protection, as follows:

- Directories: `rwxrwxr-x`
- All files, except executable files: `rw-rw-r--`
- Executable files: `rwsrwsr-x`

Always use `install_iris -setown` to fix the protection of your IRIS files. Do not try to change the protection of these files with the `chown` command.

3.3 Command Summary

Here is the location of the system log file:

HP-UXs: */var/adm/syslog/syslog.log*

Linux: */var/log/messages*

Table 1 UNIX Commands

Command	HP-UX	Linux
Display status of interprocess communication.	`ipcs`	`ipcs`
Remove a message queue, semaphore set, or shared memory ID.	`ipcrm`	`ipcrm`
Scan the I/O system and report the hardware that is found.	`ioscan`	–
Display information about system swap space.	`swapinfo -t`	`top`
Report the number of free disk blocks.	`df`	`df`
Display on-line help for UNIX commands.	`man`	`man,...`
Backup/restore files from tape.	`tar`	`tar`
Configure network interface parameters.	`ifconfig`	`ifconfig`
Show network status.	`netstat`	`netstat`
List all clients with remotely mounted disks.	`showmount`	`showmount`

Table 1 UNIX Commands (Continued)

Command	HP-UX	Linux
List all exported directories, or update the list.	`exportfs` `exportfs -a`	`exportfs` `exportfs -a`
Mount an NFS directory	`mount`	`mount`
List all mounted directories.	`mount -p`	`mount -p`
Display NFS statistics.	`nfsstat`	–
Verify network connections.	`ping`	`ping`

3.4 Linux Issues

3.4.1 Backup Procedure

SIGMET supplies a backup/restore utility called "sigbru" for Linux systems. This is described in Appendix E, sigbru Utility, on page 135.

3.4.2 Time & Date

Here is a basic summary of how some of the time related programs work:

- **date—**Just sets and displays the currently running date. The hardware clocke is not changed.
- **hwclock—**Just sets and displays the current hardware clock. The current system time is not changed.
- **redhat–config–time—**Interactive GUI to set both the time and timezone. Sets both the current date and the hardware clock. IRIS can always be configured to record using UTC. Never record using a timezone which switches to summer time.
- **timeconfig—**This program sets the time zone. Appears to be just a link to the text version of the **redhat–config–time** timezone submenu.
- **/etc/localtime—**This file is a symbolic link to a file containing the time zone information. The time zone definition files are usually kept in

/usr/share/zoneinfo. Do not be surprised if this is a copy, not a link to one of those files. If the TZ environment variable is defined, it overrides the system default. This file is configured by **timeconfig**.

- **tzselect —**This program helps you select the name of the time zone you want. It does not change the computer's setting.
- **rdate—**Gets the date from a remote system. Can optionally set it also. SIGMET recommends that you use ntpdate for this purpose.

3.4.3 LINUX for Experienced Users of Other OS

In this chapter, you can learn to avoid some of the usual traps when you start to use Linux after another OS.

In Linux files, the byte order is swapped compared to HP Unix (but similar to VMS). That means you can't transfer binary files from Linux to Unix, and also you have to set the byte order in RVP7 if you change your radar computer from Linux to Unix. In the newest version, setup files are ASCII so you can copy them.

3.4.3.1 Unix to Linux

Linux is a unix, more or less. But now you are working with a PC so you have to mount and unmount disks (such as CD-ROM and floppy) more often than in the world of bigger machines. Remember to `umount /mnt/cdrom` before hitting the button in the drive.

3.4.3.2 DOS to Linux

It's rather different. Get a good book to learn the basics or follow the instructions in this manual very carefully. Remember that for Linux it matters if words are UPPERCASE or lowercase, and it doesn't really matter if filenames end with extension or not.

3.4.4 Red Hat Configuration Utilities

The following list provides a brief description about graphical user interface (GUI) configuration utilities that must be run from within a windowed Linux environment as root:

- **redhat–config–date—**A GUI for modifying system date and time
- **redhat–config–httpd—**Apache configuration tool
- **redhat–config–keyboard—**A GUI for modifying the keyboard
- **redhat–config–language—**A GUI for modifying the system language
- **redhat–config–mouse—**A GUI for configuring mice
- **redhat–config–network—**The Network Administration Tool for Red Hat Linux
- **redhat–config–nfs—**NFS server configuration tool
- **redhat–config–packages—**Package manager for RedHat
- **redhat–config–printer—**A printer configuration backend/frontend combination
- **redhat–config–printer–gui—**A GUI frontend for printconf
- **redhat–config–proc—**A configuration tool for operating system tunable parameters
- **redhat–config–rootpassword—**A GUI for modifying the root password
- **redhat–config–securitylevel—**A GUI for modifying the system security level
- **redhat–config–services—A**n initscript and xinetd utility
- **redhat–config–soundcard—**A GUI for detecting and configuring sound cards
- **redhat–config–users—**A GUI for administering users and groups
- **redhat–config–xfree86—**A GUI for configuring XFree86

CHAPTER 4
IRIS DIAGNOSTIC UTILITIES

IRIS supplies a number of commands that can help with system management and troubleshooting.

4.1 sigmet_env Command

This program tests many things which could cause problems with an IRIS installation. If you suspect problems, please run this (logged in as the normal IRIS user), and check the results. The following are checked:

- Checks that all the IRIS operators and observers are in the /etc/users file.
- Checks that all IRIS environment variables which point to directories are defined and the directory exists, and the directory can be read and written as required.
- Checks for some obvious bad file names in the saved menu directory.
- Checks that IRIS executable files which require the "set–UID–on–execute" bit set are setup with the correct UID.
- Checks the RDA (RVP8/RCP8) environment as well.

Here is an example, with a bad file name of ".TSC".

```
$ sigmet_env

Checking IRIS_OPERATORS list...

Checking IRIS_OBSERVERS list...

Checking installation directories...

Checking configuration directories...

Checking data directories...
```

```
Checking file names in IRIS_MENU...

Bad menu filename: '/usr/sigmet/config/menu/.TSC'

Checking root file ownerships...

 Errors Detected --
 Please Check
 Printout
```

4.2 ps_iris Command

The `ps_iris` command lists all the currently active IRIS, antenna, and utility processes, including information about their owner UID, PID, time start time, and total CPU time.

Use this command to determine what IRIS processes are running on the system and when they were started. You can use the PID as an argument to the `kill` command if you need to stop a process.

```
$ ps_iris
```

IRIS Activity on `'humid.sigmet.com'` at: Wed Dec 4 16:38:50 EST 1996 Detached Processes:

```
UID       PID     PPID     C        STIME     TTY      TIME     COMMAND
operator  26705   1        0        15:34:56  ttyp6    0:00     ingfio
                                                                IRIS_IN
                                                                GFIO
operator  26709   1        0        15:34:57  ttyp6    0:00     server
                                                                IRIS_SE
                                                                RVER
operator  26713   1        0        15:34:59  ttyp6    0:00     output
                                                                IRIS_OU
                                                                TPUT13
operator  26718   26706    0        15:36:27  ttyp6    0:00     network
                                                                IRIS_NE
                                                                TWORK
operator  26714   26711    0        15:34:59  ttyp6    0:00     window
                                                                IRIS_WI
                                                                NDOW1
operator  26710   1        0        15:34:58  ttyp6    0:00     watchdo
                                                                g
                                                                IRIS_WA
                                                                TCHDOG
```

```
operator  26708   1     0     15:34:57  ttyp6   0:00   reingest
                                                       IRIS_REINGEST
operator  26706   1     0     15:34:56  ttyp6   0:00   network
                                                       IRIS_NETWORK
operator  26712   1     0     15:34:59  ttyp6   0:00   output
                                                       IRIS_OUTPUT02
operator  26711   1     0     15:34:58  ttyp6   0:00   output
                                                       IRIS_OUTPUT01
operator  26704   1     0     15:34:55  ttyp6   0:00   ingest
                                                       IRIS_INGEST


                Antenna Processes:

UID       PID     PPID    C     STIME     TTY     TIME    COMMAND
operator  26422   1       0     14:35:11  ttyp6   0:00    ant_xmt
                                                          IRIS_ANT_XMT
operator  26418   1       0     14:35:10  ttyp6   0:00    ant_rcv
                                                          IRIS_ANT_RCV


                Stand-alone Utilities:

UID       PID     PPID    C     STIME     TTY     TIME    COMMAND
alan      26717   28786   15    15:35:50  ttyqb   0:02    iris
alan      26894   26717   15    15:41:14  ttyqb   0:02    iris_clnt_recv 7
                                                          1097655
```

4.3 restart_iris Command

The `restart_iris` command runs through all the IRIS host processes and checks to see if they are still running. If any have stopped (usually due to a fatal error), it restarts them. Because of the automatic restarting feature, this utility is useful mainly for restarting processes after manually killing them for debugging purposes.

It takes the following command line options:

- `-colors`—Reload color setup information
- `-restart`—Restart all IRIS processes (default, if no other args)
- `-resurrect`—Only restart from fatal internal errors
- `-rescan`—Rescan file system for new PRODUCT files
- `-silent`—Do not print informational messages

Note that the IRIS automatic restarting feature runs "`restart_iris -resurrect -silent`".Use of the `-rescan` option is for diagnostic purposes only. Once you have a working configuration, please run **qiris** and **siris** to make sure everything is OK.

```
$ restart_iris

Restarting all IRIS processes...

 IRIS_INGEST         OK.
 IRIS_INGFIO         OK.
 IRIS_RTD_XMT        OK.
 IRIS_NETWORK        0K.
 IRIS_NORDRAD        OK.
 IRIS_PRODUCT        OK.
 IRIS_REINGEST       OK.
 IRIS_SERVER         OK.
 IRIS_WATCHDOG       OK.
 IRIS_OUTPUT01       Restarted.
 IRIS_OUTPUT02       OK.
 IRIS_OUTPUT03       OK.
 IRIS_OUTPUT04       OK.
 IRIS_ARCHIVE1       OK.
 IRIS_ARCHIVE2       OK.
 IRIS_OUTPUT07       OK.
 IRIS_OUTPUT08       OK.
```

4.4 show_iris Command

The `show_iris` command gives information about the IRIS process—when it was started, the present state of semaphores and event flags, plus the current inventory of in-use products.

The `show_iris` command also provides some usefule command line options for in–use bits. Type `show_iris -help` to learn more.

```
$ show_iris

IRIS Activity on 'hot' at: 09:52:52 17 SEP 1999

IRIS V7.11 was started at 16:19:38 16 SEP 1999 by 'joe'.

Manual startup from TTY:'/dev/tty' ; Restarts:1

Features License: 00004001-000101-WAHRMA-01-Y9ANHF

Products License: 000007FF-000101-WAHRMA-03-WFW4KR

Present states of Semaphores...

 Process Control:    Process Modes:
 FREE (ID: 5833)     FREE (ID: 5826)
 Task Schedule:      Product Schedule:
 FREE (ID: 5834)     FREE (ID: 5831)
 Ingest Directory:   Product Directory:
 FREE (ID: 5831)     FREE (ID: 5849)
 Device Table: FREE  Mode Switch Table:
 (ID: 5852)          FREE (ID: 5834)
 Archive Directory:  Error Log: FREE
 FREE (ID: 5834)     (ID: 5834)


Present states of Event Flags...

 RTDISP: CLEAR    INGEST: CLEAR
 INGFIO: CLEAR    INGFIO Mapping:
                  SET
 INGFIO Waiting:  WATCHDOG: CLEAR
 SET
 PRODUCT: CLEAR   REINGEST: CLEAR
 NETWORK: CLEAR   NORDRAD: CLEAR
 Global Mapped:
 SET


Event Flags SET for Output Processes: 7 8

Event Flags SET for Network Child Processes: 1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16

Checking INGEST inventory for in-use files:

Total files checked: 92, total in use: 0.
```

Checking PRODUCT inventory for in-use files:

Total files checked: 260, total in use: 0.

======= Product Inventory Contents =======

Prod Type	Count	Size(Mb)	Kept Count	Kept Size
PPI	0	0.00	0	0.00
RHI	0	0.00	0	0.00
CAPPI	159	92.06	21	60.92
Cross Section	0	0.00	0	0.00
Echo Tops	0	0.00	0	0.00
Tracking	0	0.00	0	0.00
Hourly Rainfall	0	0.00	0	0.00
N Hours Rainfall	0	0.00	0	0.00
Vol. Vel. Proc.	0	0.00	0	0.00
Vert.Int. Liquid	0	0.00	0	0.00
Wind Shear	0	0.00	0	0.00
Warning	1	0.01	1	0.01
Real Time PPI	0	0.00	0	0.00
Real Time RHI	0	0.00	0	0.00
Raw Data	73	52.35	73	52.35
Max with panels	0	0.00	0	0.00
User Map	0	0.00	0	0.00
User Section	0	0.00	0	0.00
User Other	0	0.00	0	0.00
Status	25	0.06	0	0.00
Shear Line	0	0.00	0	0.00
Horizontal Wind	0	0.00	0	0.00
Beam Pattern	0	0.00	0	0.00
Text	0	0.00	0	0.00
Forecast	0	0.00	0	0.00
Multi-Doppler	2	15.36	2	15.36
Image	0	0.00	0	0.00
Composite	0	0.00	0	0.00
LLWAS	0	0.00	0	0.00
	260	159.84 Mb	97	128.65 Mb

4.5 structmap Command

The `structmap` command displays the format of IRIS structures. This is useful for programmers writing applications that access IRIS data. You must install IRIS with the `-headers` option to make `structmap` available on your system.

`structmap` can take several options, producing different results. To display the list of options, enter the command without options or parameters:

```
$ structmap

Command Line Options:
```

<struct name> :	Display internal contents of IRIS structure(s)
-include <dir> :	Override default 'include' directory name
-nopack :	Force no packing of structure elements
-scan :	Produce list of all defined structures
-scanlocal :	Like 'scan', but do local directory only
-noflags :	Suppress error flags in output
-recursive :	Descend into substructures
-data :	Show numeric data read from std.input
-dimension N :	Use with '-data' for N-dimensional printout

```
E.G., "structmap 'structmap -scan'" displays everything
```

When you invoke `structmap` with the name of a structure, it displays the name of the include file where the structure is defined and a description of each element of the structure—its offset from the beginning of the

structure, its size, the number of times it occurs, its data type, and name. For example, `structmap` returns the following information about the `tape_header_record` structure:

```
$ structmap tape_header_record

tape_header_record /usr/sigmet/iris/include/output.h
```

0	12	1	struct structure_header hdr
12	16	16	char stape_id[]
28	16	16	char sitename[]
44	12	1	struct ymds_time init_time
56	2	1	SINT2 idrive
58	2	2	char ipad58x2[]
60	8	8	char sversion[]
68	252	252	char ipad_end[]
320			

structmap shows that the structure is defined in */iris/include/output.h* and contains the following elements:

- `hdr` is a structure of type `structure_header`, taking up the first 12 bytes.
- `stape_id` and `sitename` are arrays of 16 characters each, at offsets 12 and 28.
- `init_time` is a `ymds_time` structure, taking up 12 bytes starting at offset 44.
- `idrive` is a long integer at offset 56.
- `ipad58x2`, `sversion`, and `ipad_end` are arrays of 2, 8 and 252 characters,at offsets 58, 60, and 68, respectively.

The total size of the structure is 320 bytes.

When you invoke `structmap` with the `-scan` option, it lists the names of all the structure defined by IRIS.

```
$ structmap -scan

ant_manual_setup
```

```
bitex_field_def

bitex_top_def

cappi_psi_struct

.

.

.
```

You can also use the `-scan` option to recursively call `structmap` and display the format of all the structures in the system. The following command takes this output and redirects it to a file:

```
$ structmap 'structmap -scan' > allstructs.out
```

APPENDIX A

INSTALLING CENTOS 7.X

A.1 Overview

This appendix provides instructions on installing and configuring CentOS7 Operating System for the Vaisala WR (IRIS & RDA) application software. Read this appendix before you begin.

Vaisala provides a customized ISO image for CentOS 7.1 on the Vaisala FTP website at ftp.vaisala.com/outgoing/releases/CentOS/7/CentOS-7-x86_64-vaisala-1503-01. If you are using ISO image from https://www.centos.org/download, we recommend that you obtain the "everything" ISO image.

Vaisala supports two installation methods from the Vaisala spin version of the ISO image "CentOS-7-x86_64-vaisala-1503-01.

- Automatic - unattended installation
- Manual - interactive installation

For the manual and automatic installation methods you can use the local DVD or USB device as your installation media. We recommend that you use the Automatic process unless you have special system configuration needs or if your custom configuration fails the Automatic installation process.

Installing Linux requires a Linux software installation tree and a boot device. You must transfer the CentOS7 distributions ISO images to the media that you are going to use in the installation. You need the following to create installation media:

- PC running Windows 7, or CentOS/Fedora (recommend the latest version)
- DVD writer

- USB port
- USB Flash Drive 64GB. Preferably a USB 3.0 drive because data transfer is 10 times faster than USB 2.0
- DVD disc media

A.2 Creating Installation Media

You can run the installation process from either DVD or USB installation. This section explains how to create and initialize the installation media.

A.2.1 Creating DVD Installation Media

On Windows 7 (recommended):

1. Insert DVD media into the DVD drive.
2. Right click the ISO file.
3. Select **Open with->Windows Disc Image Burner** to burn the ISO image on the DVD.

On the Linux (CentOS,Fedora):

Use wodim or cdrecord program to burn the ISO image file on the DVD.

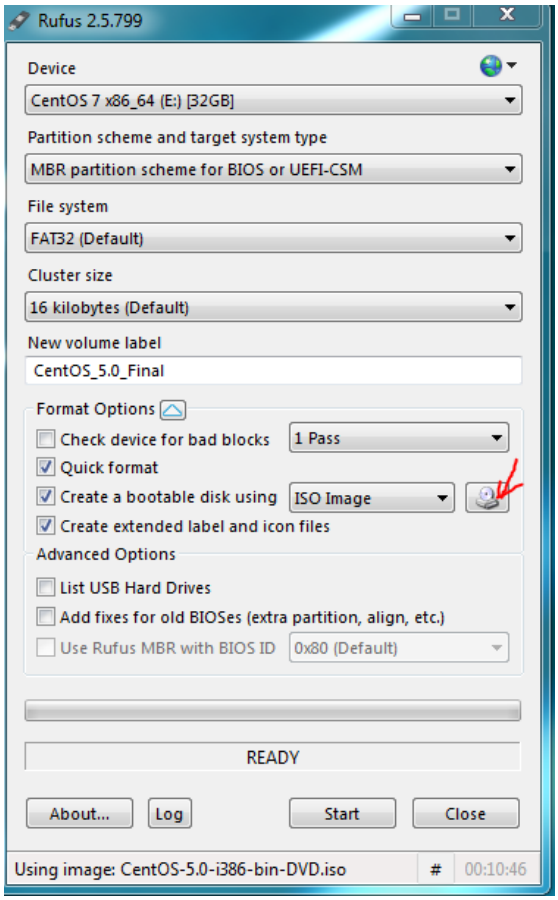
1. "$ wodim -devices (To scan burning device on your system)
2. "$ wodim -v dev=/dev/xxx speed=4 -eject path/toCentOS.iso".

A.2.2 Creating USB Installation Media

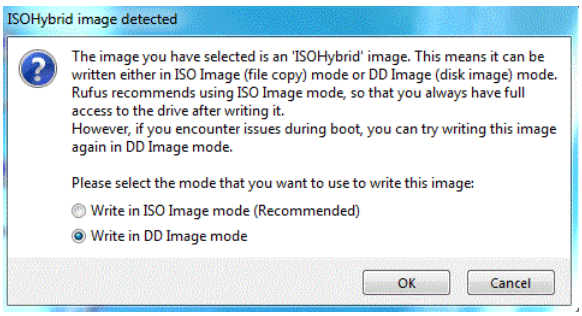
On Windows 7:

1. Use a standalone program such as "rufus" (available at http://rufus.akeo.ie/). Follow the on-screen instructions.
2. Launch "rufus" by double-clicking the program icon.
3. Insert a USB drive in the USB port.

4. Select the drop-down list to the right of the **Create a bootable disk using**, and select **ISO Image**.



5. Select the **Disc** icon and then select the iso image.
6. Select **Write in DD Image mode** if a warning for the hybrid ISO image is displayed.



7. Select **Close**.

On Linux (CentOS/Fedora):

Warning: This operation destroys data on the device you operate on.

1. $ lsblk (to list block device on your system and take note of the output)
2. Insert a USB drive in the USB port.
3. $ lsblk (compare the output to previous step, additional block device from this output is your USB device)
4. $ dd if=path/toCentOS.iso of=/dev/xxx (where /dev/xxx is the path to the USB drive ; for example, /dev/sdc (do not use partition number for USB device).

A.3 Automated Installation (Unattended Installation with KICKSTART)

A.3.1 Booting the System

You must configure the system to boot from the media device.

The instructions in this section are for the Vaisala-provided server. If you are using a different system, consult your systems manual for instructions.

1. Power-up the system by pressing the dark red button on the right hand side of the front of the server.
2. If you are using USB port for the first time, enable it by inserting the USB drive it into the USB port.
3. Press the delete key to enter the bios setup window.
4. Use the arrow keys to highlight the **Boot** option at the top of the window and press ENTER.
5. In the **Boot** window, use the arrow keys to choose the 1st boot device and highlight the installation media and press ENTER.
6. Have your installation media ready to insert into the computer.
7. Press F10 to save the configuration and ENTER to accept the process. The boot process restarts.

8. While the system is rebooting either insert the USB stick into the USB port or the DVD disc into the DVD drive.

   The customized Kickstart is configured to install to the first hard drive on the system -- this is the recommended system configuration.

9. In the installation menu, use the arrow keys to select the media you have configured earlier (either the USB or cdrom/dvd Kickstart option).

10. Press ENTER The installation starts automatically.

Figure 1 Install Centos with USB

11. When the installation is complete, select **Reboot** to reboot the system. Depending on your system bios boot sequence setting, you may have to remove the installation media right after you see the rebooting message displayed to the window in order to boot using the hard drive instead of the installation media.

A.4 Initial Setup

When the system reboots for the first time, the initial settings window allows you to setup the local date and time, configure the systems network and host name, set the root password and create a user account.

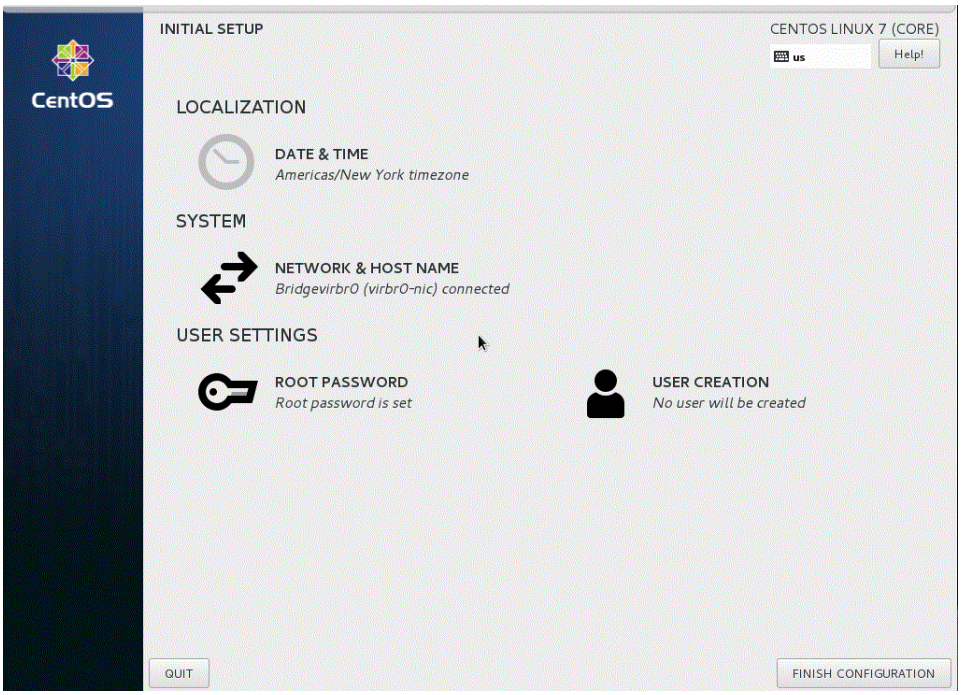


Figure 2 Initial Setup

A.4.1 Setting Localization Date & Time

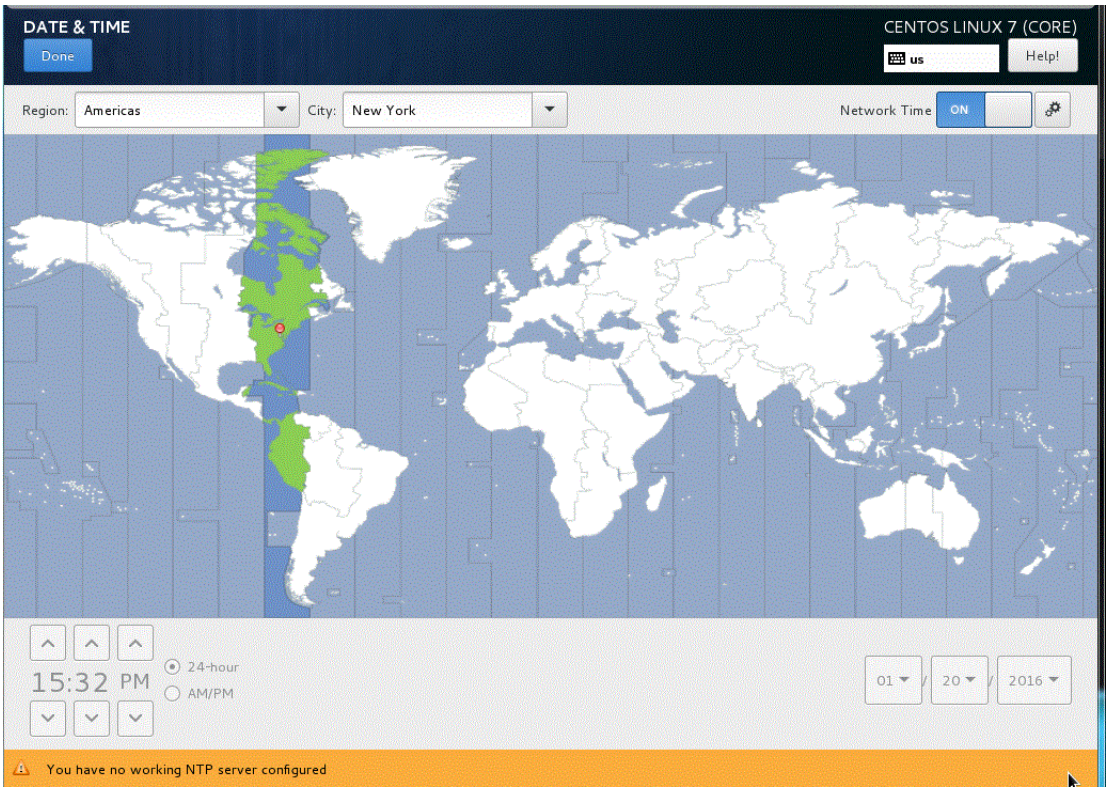


Figure 3 Date & Time

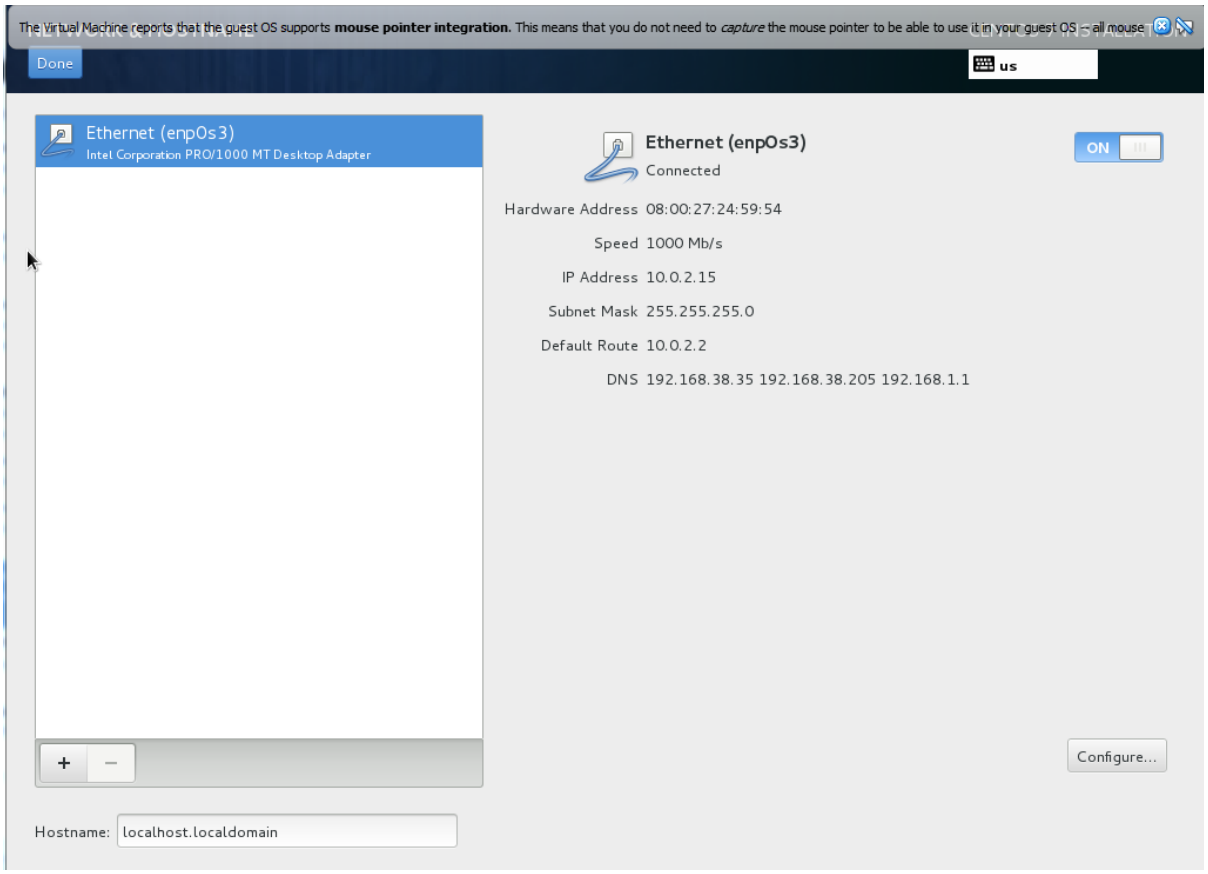
1. In the Localization section on the installation summary page, select **DATE & TIME** to set your local date and time preferences.
   - In the banner above the map select the Region and City that represents your time zone from the drop down menus.
   - If you have an NTP server in your network:
     - Leave the Network Time setting in its default ON position.
     - Select the gears to the right of the Network Time switch to configure the server.
   - If you do not have an NTP server, the date and time is set manually:
     - Switch the Network Time switch OFF by switching on the slider next to the word ON. OFF should be displayed next to Network Time.
     - In the lower left hand corner enter the current time and select either 24 hour format or AM/PM format.

- In the lower right hand corner enter the current date.

2. Review your settings to verify they are correct.
3. Select **Done** in the upper left hand corner to save the configuration and return to the installation summary page.

A.4.2 Configuring the System and Network

1. In the installation summary page, select **NETWORK AND HOST NAME** to bring up the **Network and Host Name** window.
2. Enter the host name in the text box in the lower left window.

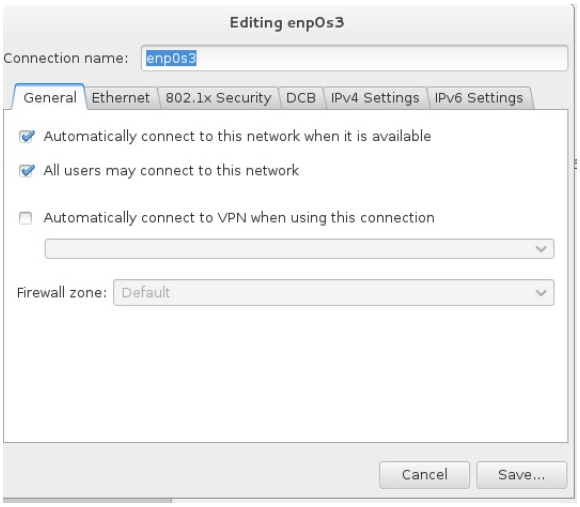


If you plan to run RDA software on this computer and connect to the RVP901 (IFDR), two Ethernet ports are required and should appear in the panel on the left hand side of the Network and Host Name window. The two ports probably have the same name one ending in 0 and one

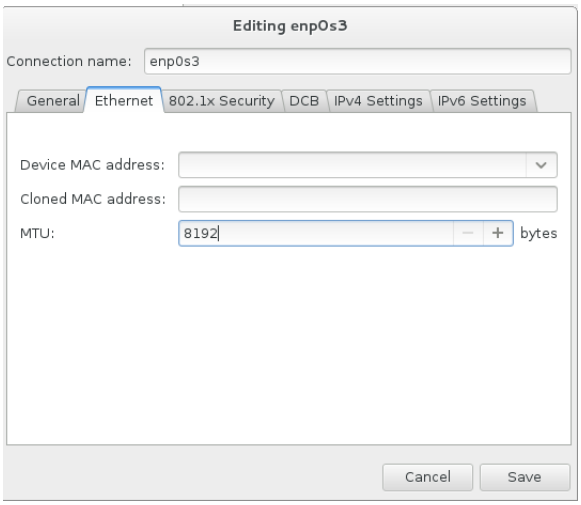
ending in 1, for example enp1sof0 and enp1sof1. The interface ending in 0 (eth0) is typically connected to the internet and the interface ending in 1 (eth1) is a dedicated local network directly connected to the RVP901 (IFDR).

If you do not plan to connect the computer to the RVP901 (IFDR) then only eth0 needs to be configured using th procedure.is If the computer is connecting to the RVP901 (IFDR), follow this procedure once for eth0 and once for eth1.

3. Enter the host name in the text box in the lower left window.
   - Select the network device you wish to configure listed in the panel on the left hand side. The selected device is highlighted as shown below.
   - To enable the network interface ON, select the blank button next to the OFF in the upper right hand corner. The button should slide to the right and ON is displayed and highlighted.
   - Select **Configure** button on the bottom right hand corner to display the Editing window.
4. In the editing window, select the **General Tab** to set the connectivity options.



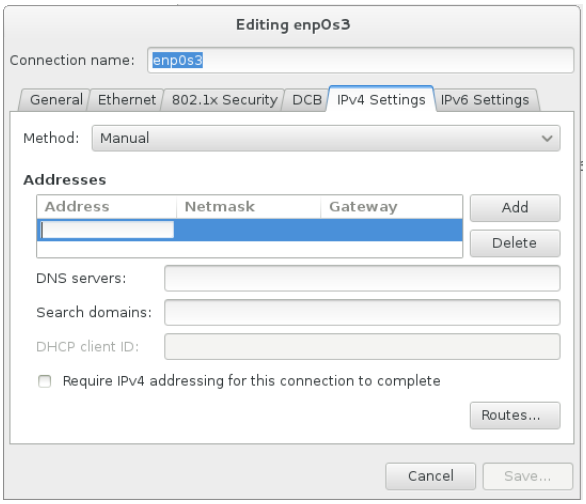
   - Select **Automatically connect to this network when it is available**
   - Select **All users may connect to this network**
5. If you are configuring the RVP9IFDR port:



a. In the **Editing** window select the **Ethernet** tab.

b. In the **MTU** field, type 8192.

6. In the editing window select the **IPv4 Settings** tab.



a. In the **Method** drop down menu, select **Manual**.

b. Select **Add**.

c. Enter the IP address, netmask, and gateway in the text entry boxes under the headers.

- If you are configuring your eth0 interface connected to the internet or your corporate network. The settings in this window

are specific to your network configuration, if you are unsure what to enter in these boxes contact your IT support staff.

- If you are configuring your eth1 interface for direct connection to the RVP9IFDR use the following settings.

Table 1 Configuring for Direct Connection to RVP9IFDR

Setting	Value
Address	10.0.1.X, where X is the last octet of your eth0 address. X cannot equal 254 as this is reserved for the RVP901 (IFDR).
Netmask	24
Gateway	10.0.1.1

d. If configuring your eth0 interface enter your DNS server address in the **DNS server** field. If configuring your eth1 interface leave this blank.

e. If configuring your eth0 interface enter your Domain Name in the **Search domains** field. If configuring your eth1 interface leave this blank.

f. Check the **Require IPv4 addressing for this connection** box near the bottom of the page,.

g. Select **Save** in the lower right corner to finish network configuration.

Select **Done** in the upper left hand corner of the **Network and Host Name** window to return to the installation summary page.

A.4.3 Setting the Root Password

The default password is "xxxxxxxx".

1. Select **ROOT PASSWORD**. The **Root Password** window opens.
2. Enter your root password.

   Check the password strength meter. While Vaisala recommends a strong password, the software does not stop you from entering a week one.
3. In the confirm text box, re-enter your root password.

4. In the upper left hand corner, select **Done** to return to the main configuration page. If your password is weak, you are prompted to select **Done** a second time.

In the **Installation Summary page / Initial Settings** page, the text under the Root Password header says **Root password is set**.

A.4.4 Creating Users

Note: Do not use the user name "radarop", or "observer" when creating user accounts. These user names are reserved for use in the IRIS/RDA software installation.

1. Select **USER CREATION** to open the **User creation** window.
2. In the user name text box, enter user account name or if you wish to have the user account name generated from the Full name, enter the user's full name in the **Full name** text box.
3. In the password text box, enter your user account's password.
4. In the confirm text box, re-enter your user account's password.
5. Select **Done** to save the account and return to the main configuration page. If your password is weak, you are prompted to select **Done** a second time.

   In the **Installation Summary page / Initial Settings** page, the text under the User Account header says *User 'username' will be created* where username matches the name entered in the **User name** text box.

A.4.5 Finishing the Configuration

After setting your localization, network and user settings, in the lower left hand corner of the **Initial Settings Window**, select **FINISH CONFIGURATION**.

This takes you to the login window where you can login with the user account just created.

A.4.6 Logging In With Your User Account

After rebooting, the login window shows the user account you created. To login:

1. Select your user account and enter your password in the text box.
2. Select **Sign in** to log on.

   The first time you enter each new user account, you are asked to answer some initialization settings, these should be set properly and no setting changes should be required.
3. In the **Welcome** window, select your language and select **Next** in the lower right hand corner.
4. In the **Input Sources** window, verify your source and select **Next**.
5. In the **On-line Accounts** window, select **Next**.
6. In the **Thank you** window, select **Start using CentOs Linux**.
7. Read the **GNOME Help** window and press the **X** in the upper right hand corner to close the window.

The installation and initialization process for CentOs 7 is complete.

A.5 Manual Installation (Interactive)

A.5.1 Booting the System

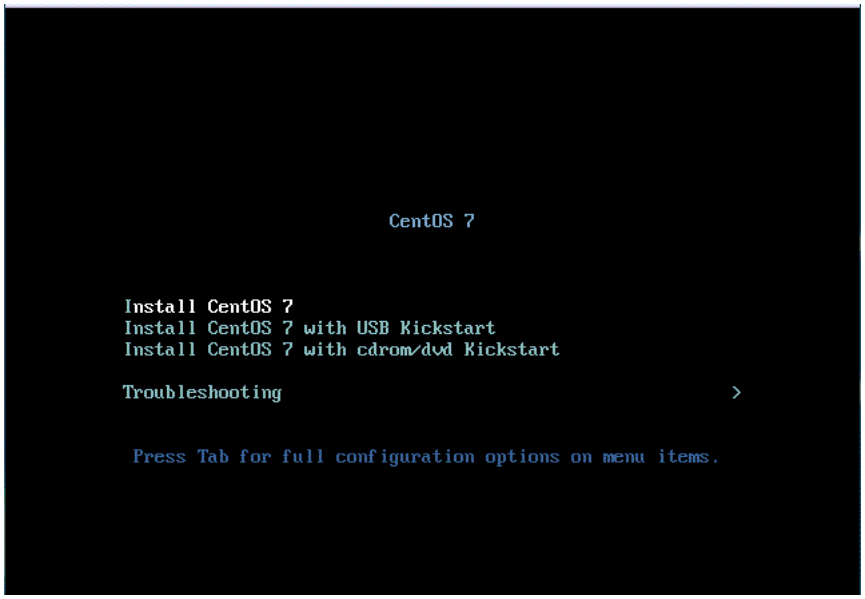
You must configure the system to boot from the media device that you have created.

The instructions in this section are for the Vaisala-provided server, if you are using a different system, consult your systems manual for instructions.

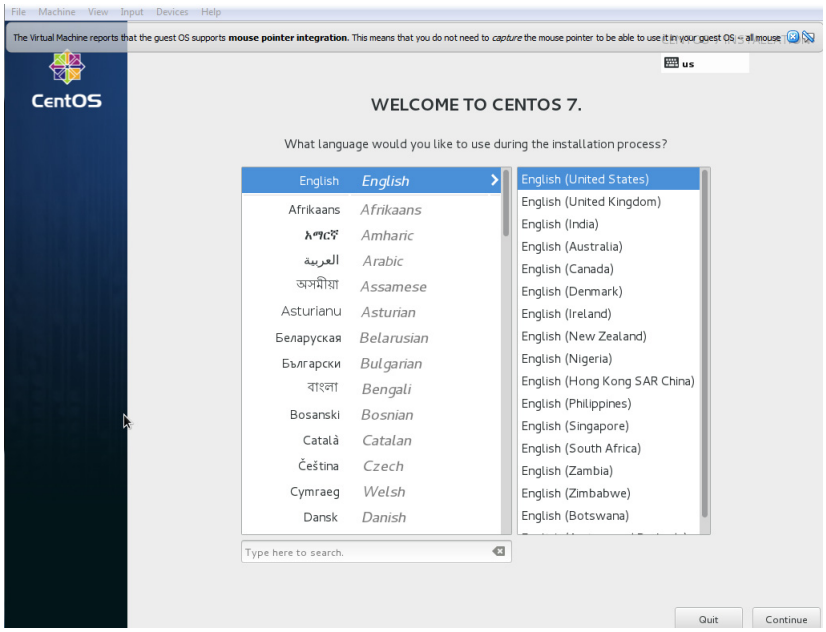
1. Power-up the system by pressing the dark red button on the right hand side of the front of the server.
2. If you are using USB port for the first time, enable it by inserting the USB drive it into the USB port.
3. Press the delete key to enter the bios setup window.
4. Use the arrow keys to highlight the Boot option at the top of the window and press ENTER.
5. In the Boot window, use the arrow keys to select **Boot Device Priority** and press ENTER.

6. In the Boot Device Priority window, use the arrow keys to choose the 1st boot device and select the media that you are installing from. Press ENTER.
7. Have your installation media ready to insert into the computer.
8. Press F10 to save the configuration. The boot process restarts.
9. While the system is rebooting either insert the USB stick into the USB port or the DVD disc into the DVD drive.

   When the system has booted from the installation media, the installation welcome page is displayed.



10. Select **Install CentOS 7** using the up arrow, and press ENTER. The Welcome to CentOs 7 window is displayed.
11. Select a language from the left hand panel and keyboard layout from the right hand panel.



12. Select **Continue**.

The installation summary page is displayed with three sections: a localization section to allow you to configure the local time and date, the software section to select the installation source and configure what is to be installed and the system section to setup your network interface and hostname.

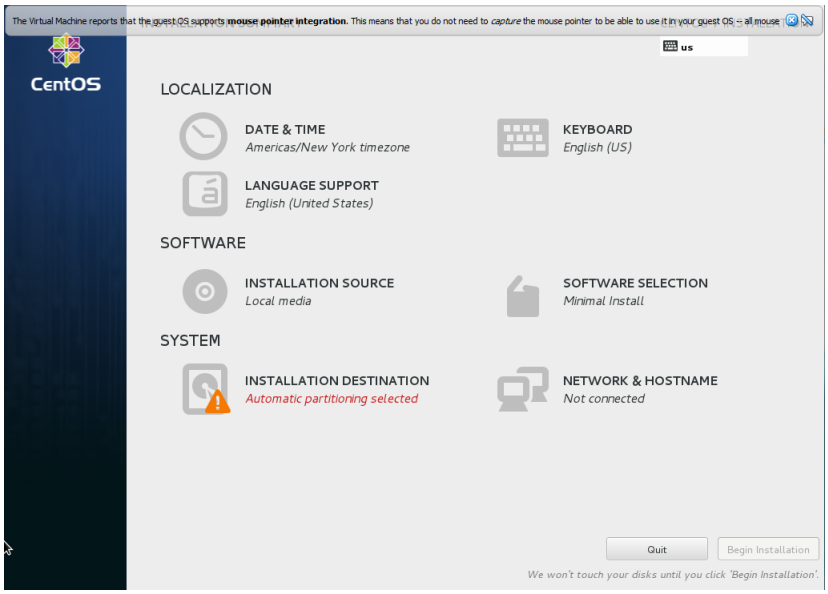


Figure 4 Installation Summary Page

A.5.2 Setting Localization Date & Time

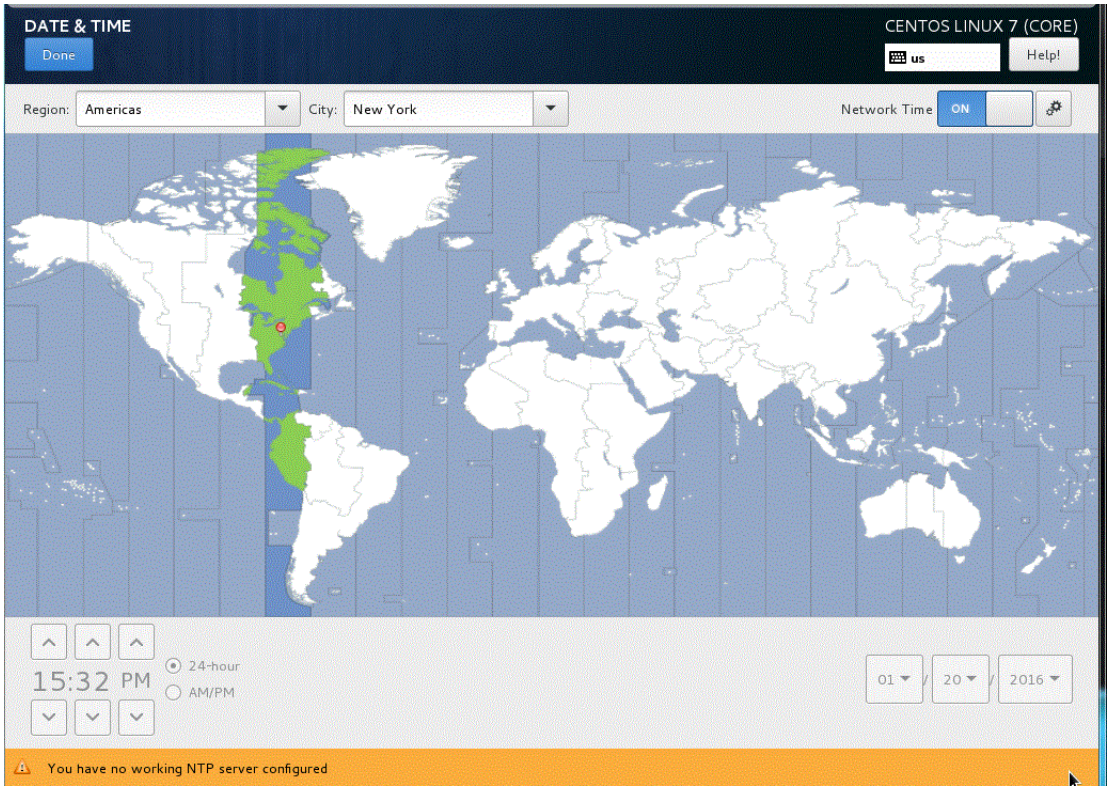


Figure 5 Date & Time

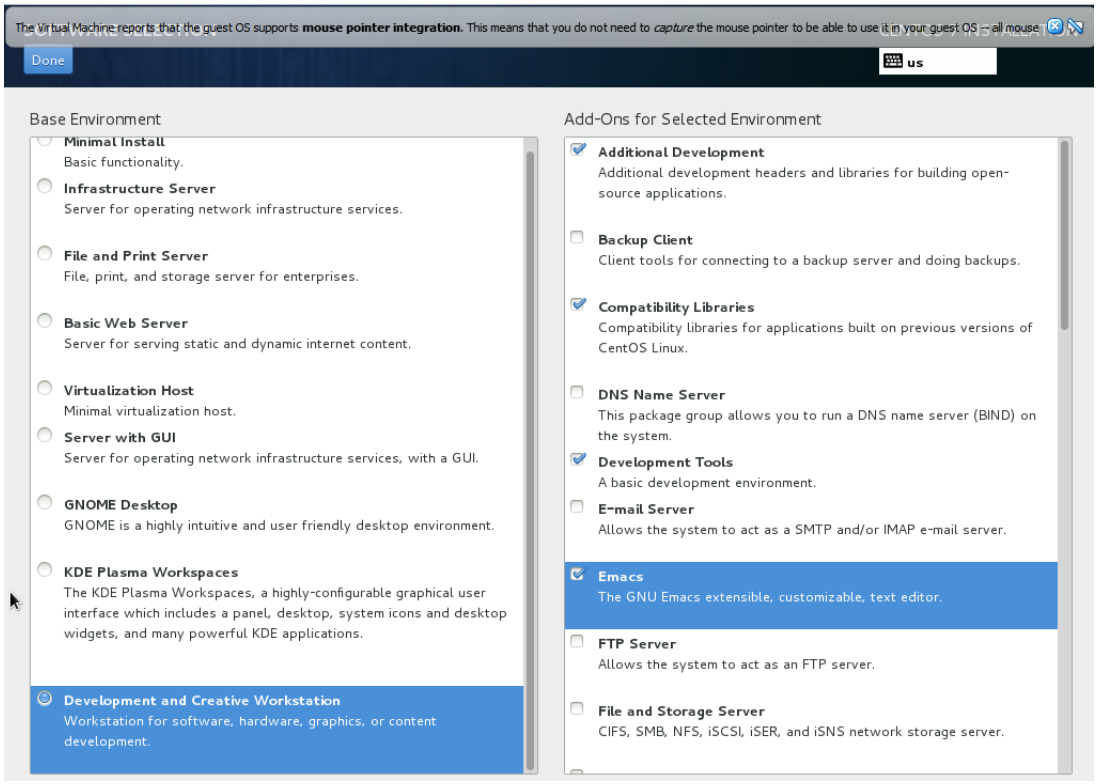
1. In the Localization section on the installation summary page, select **DATE & TIME** to set your local date and time preferences.
   - In the banner above the map select the Region and City that represents your time zone from the drop down menus.
   - If you have an NTP server in your network:
     - Leave the Network Time setting in its default ON position.
     - Select the gears to the right of the Network Time switch to configure the server.
   - If you do not have an NTP server, the date and time is set manually:

- Switch the Network Time switch OFF by switching on the slider next to the word ON. OFF should be displayed next to Network Time.
- In the lower left hand corner enter the current time and select either 24 hour format or AM/PM format.
- In the lower right hand corner enter the current date.

2. Review your settings to verify they are correct.
3. Select **Done** button in the upper left hand corner to save the configuration and return to the installation summary page.

A.5.3 Selecting the Software

1. In the **Software** section of the installation summary page, leave the INSTALLATION SOURCE in its default state set to **Local media**.
2. Select **SOFTWARE SELECTION** on the right side of the window. The Software Selection window appears.

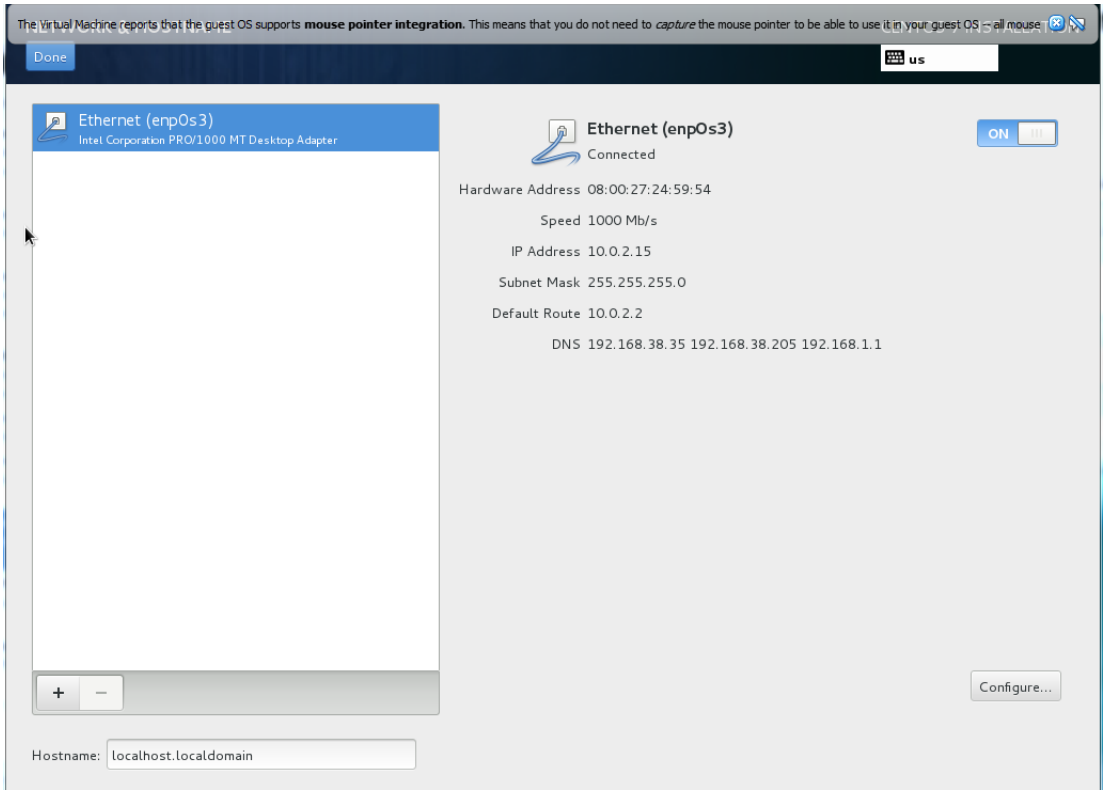


3. In the left panel labeled **Base Environment**, select **Development and Creative Workstation**.

4. In the right panel labeled **Add-Ons for Selected Environment,** select the listed additional options from the right pane by checking the check box. Use the scroll bar to the right of the panel to view all of the options.
   - Additional Development
   - Compatibility Libraries
   - Development Tools
   - Emacs
   - FTP Server
   - Graphics Creation Tools
   - Legacy X Window System Compatibility
   - Network File System Client
   - Office Suite and Productivity
   - Platform Development
   - Legacy UNIX Compatibility
5. Select **Done** in the top left corner to finish software selection and return to the installation summary page.

A.5.4 Configuring the System and Network

1. In the installation summary page, select **NETWORK AND HOST NAME** to bring up the **Network and Host Name** window.
2. Enter the host name in the text box in the lower left window.



If you plan to run RDA software on this computer and connect to the RVP901 (IFDR), two Ethernet ports are required and should appear in the panel on the left hand side of the Network and Host Name window. The two ports probably have the same name one ending in 0 and one ending in 1, for example enp1sof0 and enp1sof1. The interface ending in 0 (eth0) is typically connected to the internet and the interface ending in 1 (eth1) is a dedicated local network directly connected to the RVP901 (IFDR).

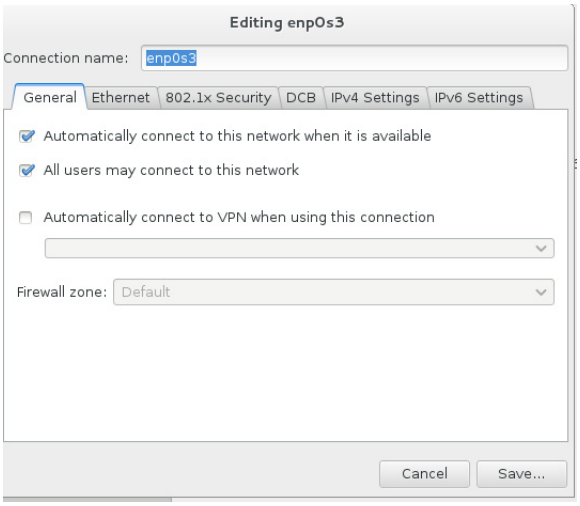
If you do not plan to connect the computer to the RVP901 (IFDR) then only eth0 needs to be configured using th procedure.is If the computer is connecting to the RVP901 (IFDR), follow this procedure once for eth0 and once for eth1.

3. Enter the host name in the text box in the lower left window.

   - Select the network device you wish to configure listed in the panel on the left hand side. The selected device is highlighted as shown below.
   - To enable the network interface ON, select the blank button next to the OFF in the upper right hand corner. The button should slide to the right and ON is displayed and highlighted.

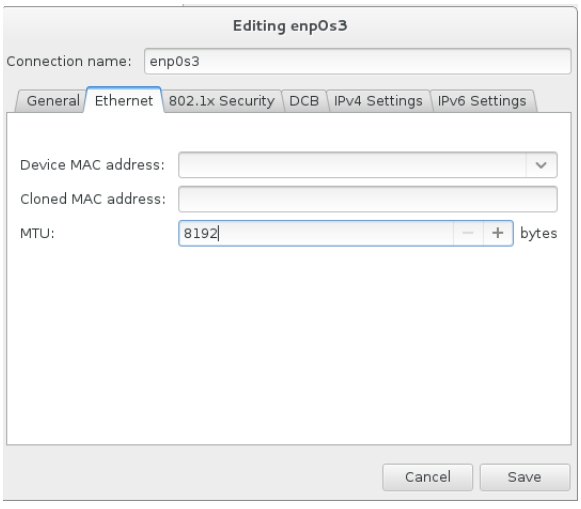
- Select **Configure** button on the bottom right hand corner to display the Editing window.

4. In the editing window, select the **General Tab** to set the connectivity options.



- Select **Automatically connect to this network when it is available**
- Select **All users may connect to this network**

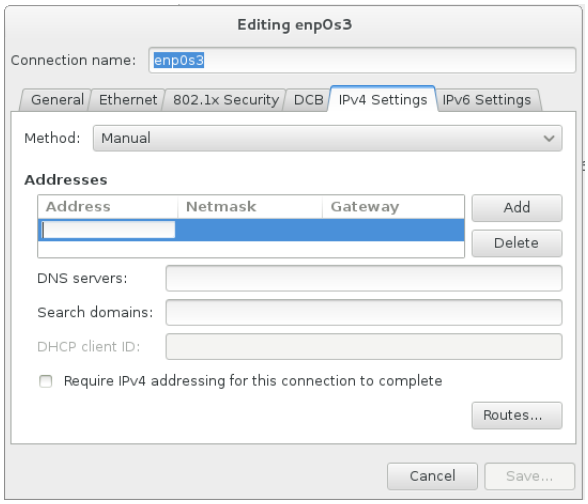
5. If you are configuring the RVP9IFDR port:



a. In the **Editing** window select the **Ethernet** tab.

b. In the **MTU** field, type 8192.

6. In the editing window select the **IPv4 Settings** tab:



a. In the **Method** drop down menu, select **Manual**.

b. Select **Add**.

c. Enter the IP address, netmask, and gateway in the text entry boxes under the headers.

- If you are configuring your eth0 interface connected to the internet or your corporate network. The settings in this window are specific to your network configuration, if you are unsure what to enter in these boxes contact your IT support staff.
- If you are configuring your eth1 interface for direct connection to the RVP9IFDR use the following settings.

Table 2 Configuring for Direct Connection to RVP9IFDR

Setting	Value
Address	10.0.1.X, where X is the last octet of your eth0 address. X cannot equal 254 as this is reserved for the RVP901 (IFDR).
Netmask	24
Gateway	10.0.1.1

d. If configuring your eth0 interface enter your DNS server address in the **DNS server** field. If configuring your eth1 interface leave this blank.

e. If configuring your eth0 interface enter your Domain Name in the **Search domains** field. If configuring your eth1 interface leave this blank.

f. Check the **Require IPv4 addressing for this connection** box near the bottom of the page,.

g. Select **Save** in the lower right corner to finish network configuration.

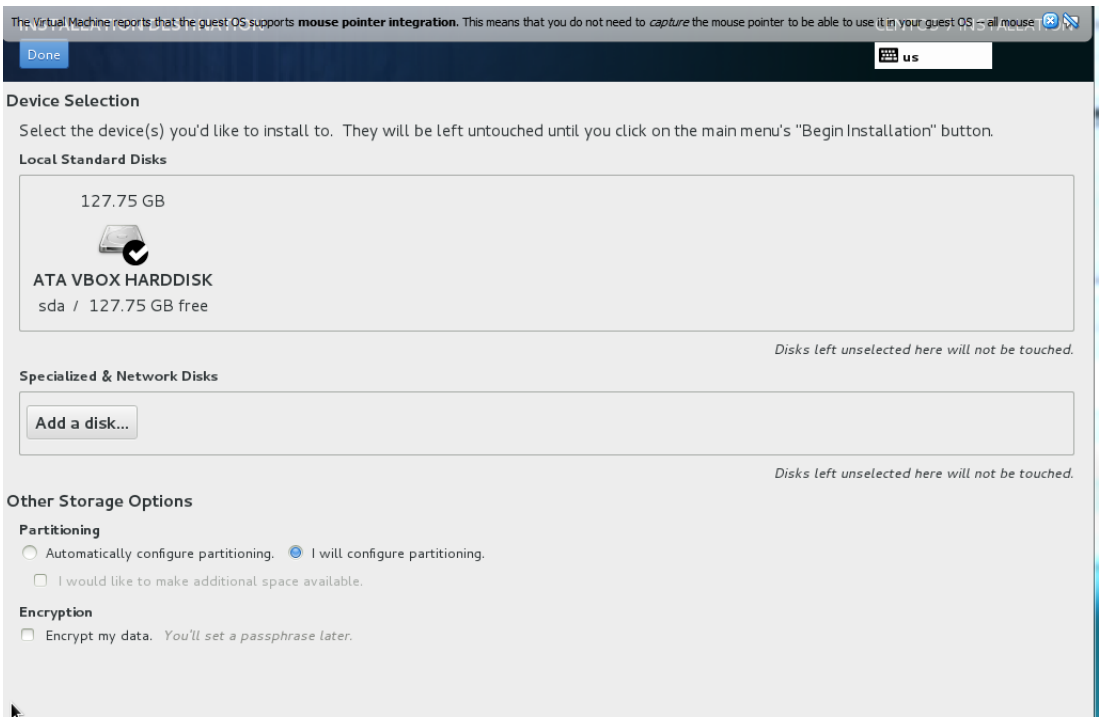
7. Select **Done** in the upper left hand corner of the **Network and Host Name** window to return to the installation summary page.

A.5.5 System / Destination Installation

The **Destination Installation** header in the **System** section allows you to partition your disk during installation.

A.5.6 Partitioning the Destination Disk

1. On the installation summary page, select **Destination Installation.**
2. Select destination disk to install CentOS to. There might be more than one disk list here if your system has more than one drive.
3. Select **I will configure partitioning** >**Done**" to continue.



See *Vaisala Recommended Partition Settings* for recommended settings.

If your drive is already partitioned and you want to change to the recommended settings, follow the instructions in section *Delete Existing Partitions* section and then continue to the instructions in section C*reate New Partitions*.

If your drive has never been partitioned, see section *Create New Partitions*.

If you wish to reuse your existing settings, see section *Re-Using Existing Partitions*.

A.5.7 Vaisala-recommended Partition Settings

Table 3 Partition Settings

Partition	File System Type	Minimum Partition Size
/boot	Ext4	250MB
Swap	swap	The size of your system if memory is < 8GB
/	Ext4	40GB
/usr/iris_data	Ext4	Remaining space

Table 4 Partition Settings Using LVM

Partition	File System Type	Minimum Partition Size
/boot	Ext4	250MB
Swap	swap	The size of your system if memory is < 8GB
LVM physical volume		Remaining space, as one LVM volume group

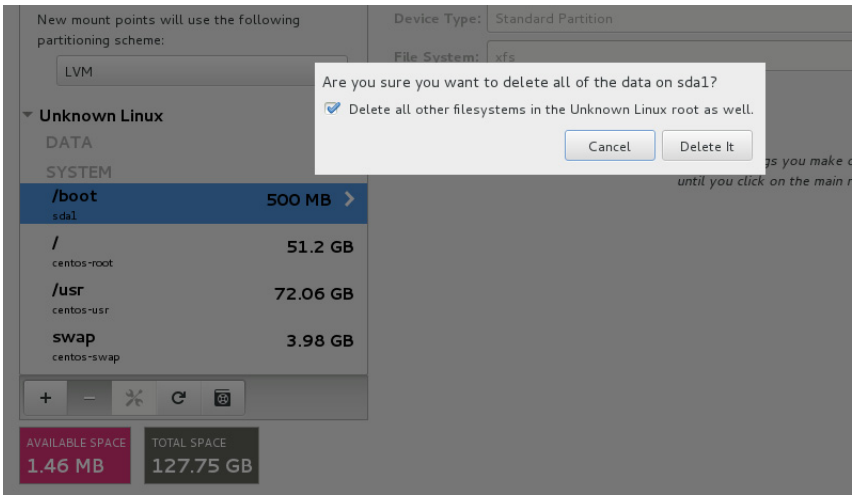
Table 5 LVM Physical Partitioning

Partition	Size and Type
/	40GB, Ext4
/usr/iris_data	remaining space, Ext4

A.5.8 Deleting Existing Partitions

If you do not want to use the existing partitions, you must delete them to provide disk space for your installation.

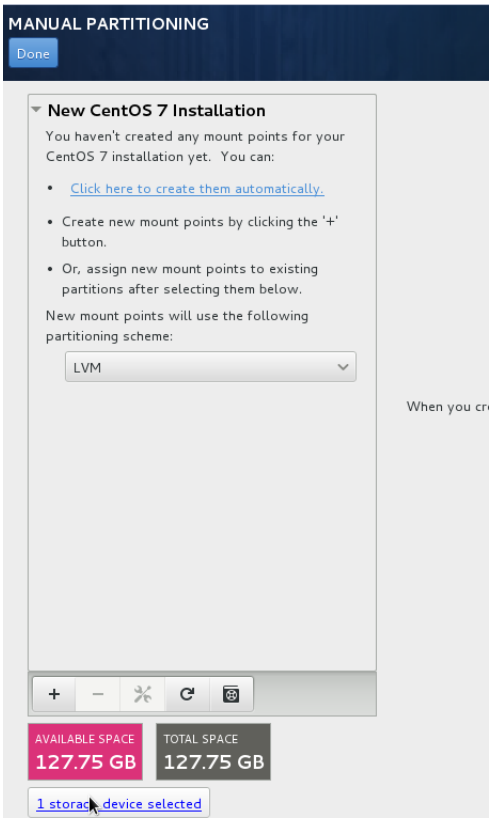
1. Select the arrow to the left of the drive name you want to modify to expand the partitioning scheme.
2. Select a partition to delete.
3. Select a minus sign (-) icon to delete the partition.
4. On the pop-up window, check **Delete all other filesystems….** and select **Delete it**.



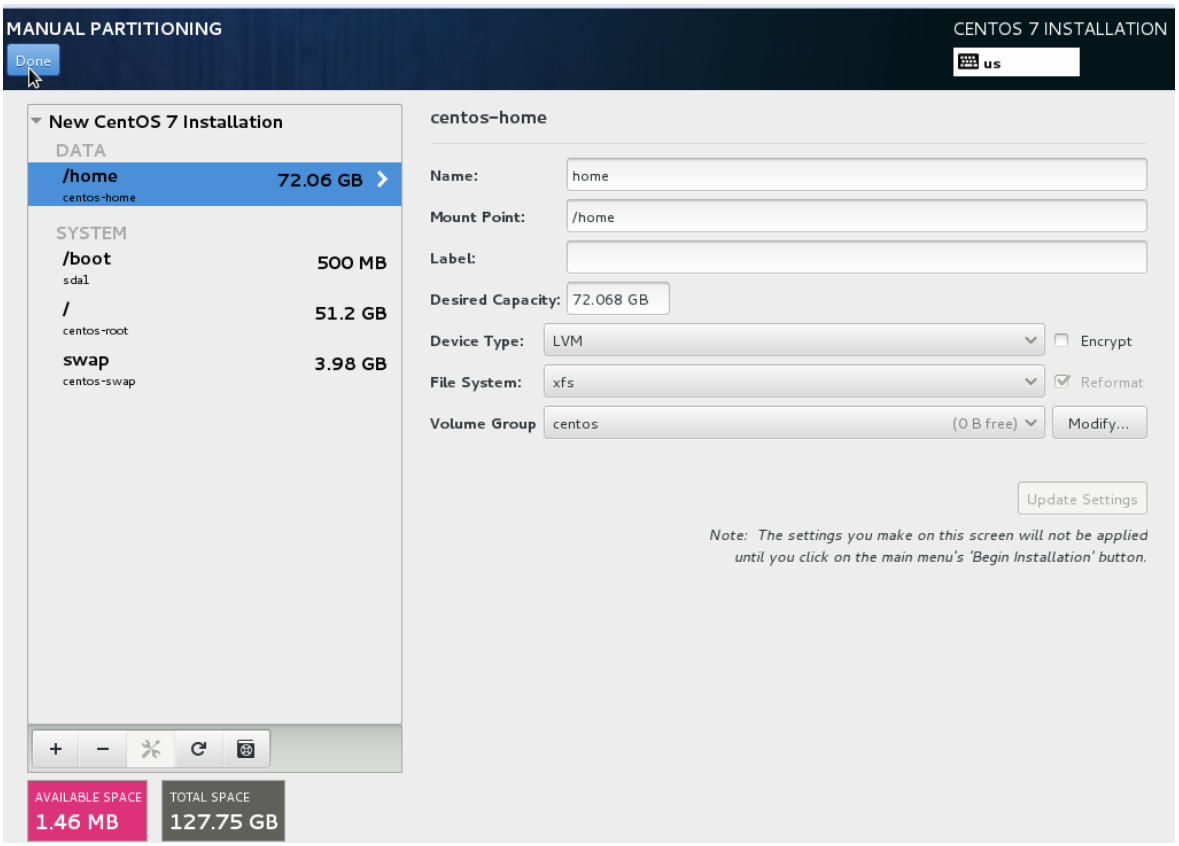
A.5.9 Creating New Partitions

Vaisala recommends the LVM partition scheme:

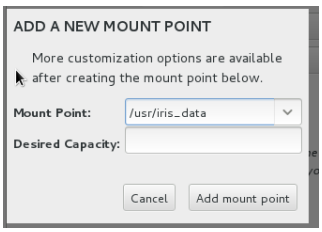
1. Select **Click here to create them automatically**



2. If the /home partition exists, delete /home partition by selecting the minus (-) icon



3. Add a partition by selecting the plus (+) icon.
4. Enter */usr/iris_data* in the mount point text box and size of the partition (example: 20GB), and select **Add mount point**



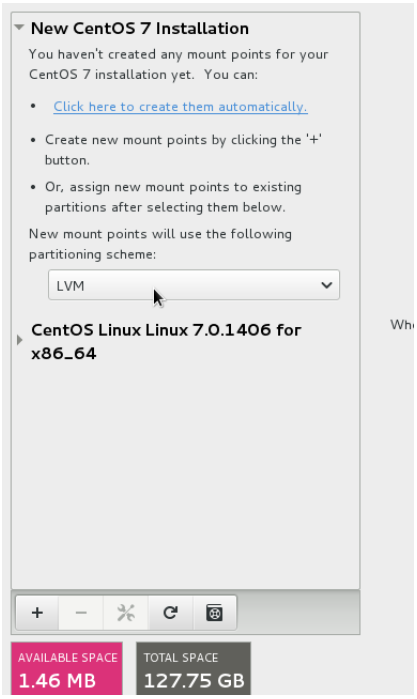
5. One at a time, select each partition and modify the value in the **Desired Capacity** box with values shown in section *Vaisala-recommend Partition Settings*.
6. Select **Done > Accept changes** to finish partitioning
7. Select **Begin installation** to start installation.

8. While installation is in progress, follow the instructions in **User Settings**.

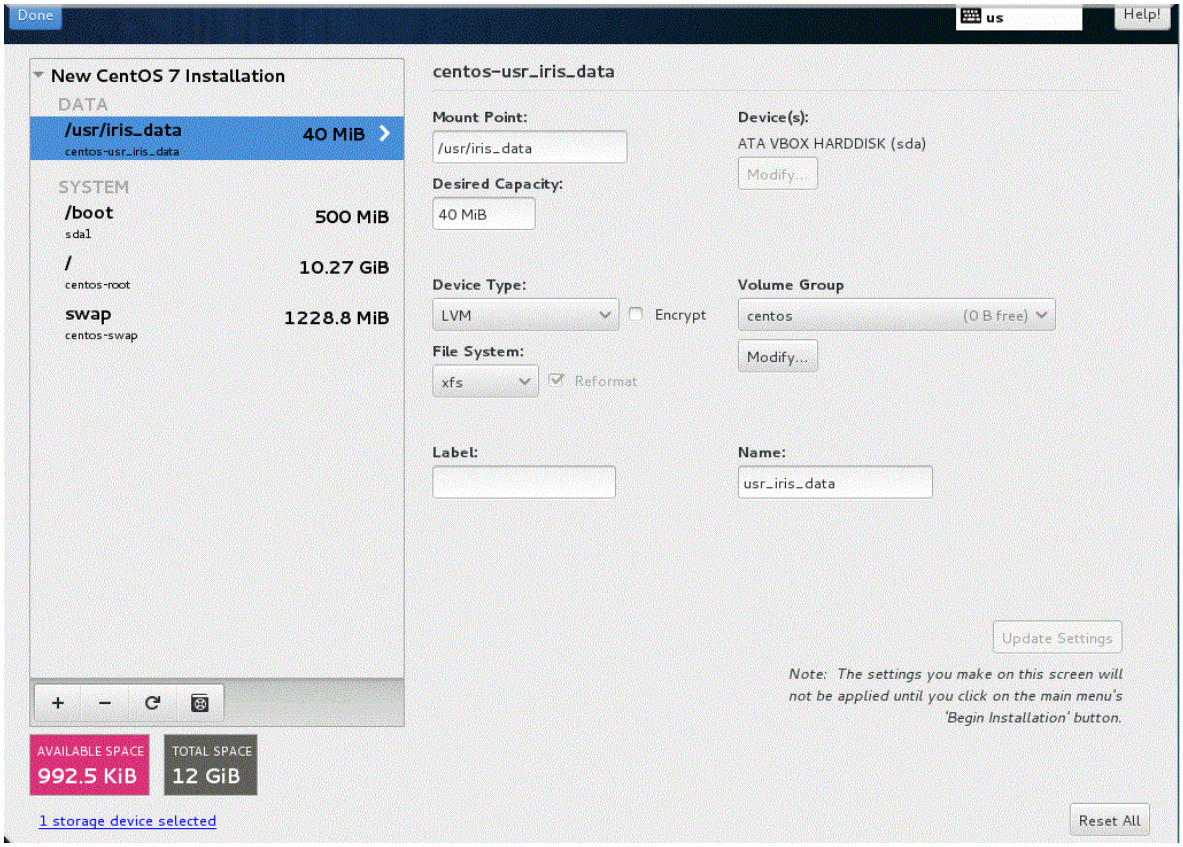
A.5.10 Re-using Existing Partitions

If your disk has an operating system installed, the partitioning scheme list is displayed.

1. Select the arrow head to the left of the drive name you want to re-use to expand the partitioning scheme.



2. In the partition window, for each partition shown in the left pane of the partition window, select the partition and enter the name shown in the **Mount Point** field.



3. Check the reformat box in the **File System** selection section so that a check appears in it.
4. Select **Update Setting**. For the swap partition, you do not need to enter the mount point name but you must check the reformat box and update the settings.
5. For each partition, update the settings and select **Done**.
6. Select **Accept Changes** to return to the installation summary page.

A.5.11 Starting Installation

Before starting the installation, have your root password and user account information on hand.

In the lower right corner of the installation summary page, select **Begin installation**. While installation is in progress, complete the steps in section, *Initial Setup*.

A.5.12 Performing the Initial Setup

After you select **Begin installation** in the installation summary page, the user settings configuration page appears.

Configure the setting while the installation process is in progress and completed before the end of the installation.

A.5.13 Setting the Root Password

1. Select **ROOT PASSWORD**. The **Root Password** window opens.
2. Enter your root password.

   Check the password strength meter. While Vaisala recommends a strong password, the software does not stop you from entering a week one.
3. In the confirm text box, re-enter your root password.
4. In the upper left hand corner, select **Done** to return to the main configuration page. If your password is weak, you are prompted to select **Done** a second time.

In the **Installation Summary page / Initial Settings** page, the text under the Root Password header says **Root password is set**.

A.5.14 Creating Users

Note: Do not use the user name "radarop", or "observer" when creating user accounts as these user names are reserved for use in the IRIS/RDA software installation.

1. Select **USER CREATION** to open the **User creation** window.
2. In the user name text box, enter user account name or if you wish to have the user account name generated from the Full name, enter the user's full name in the **Full name** text box.
3. In the password text box, enter your user account's password.
4. In the confirm text box, re-enter your user account's password.
5. Select **Done** to save the account and return to the main configuration page. If your password is weak, you are prompted to select **Done** a second time.

In the **Installation Summary page / Initial Settings** page, the text under the User Account header says *User 'username' will be created* where user name matches the name entered in the **User name** text box.

A.5.15 Rebooting the System

When the installation is complete, select **Reboot** to reboot the system. Depending on your system bios boot sequence setting, you may need to remove the installation media right after you see the system shutdown complete window flash by in order to boot using the hard drive.

After rebooting, the system displays a login window allowing you to login with the user account created in the previous steps.

A.5.16 Logging In With Your User Account

After rebooting, the login window shows the user account you created. To login:

1. Select your user account and enter your password in the text box.
2. Select **Sign in** to log on.

   The first time you enter each new user account, you are asked to answer some initialization settings, these should be set properly and no setting changes should be required.
3. In the **Welcome** window, select your language and select **Next** in the lower right hand corner.
4. In the **Input Sources** window, verify your source and select **Next**.
5. In the **On-line Accounts** window, select **Next**.
6. In the **Thank you** window, select **Start using CentOs Linux**.
7. Read the **GNOME Help** window and press the **X** in the upper right hand corner to close the window.

The installation and initialization process for CentOs 7 is complete.

APPENDIX B

INSTALLING CENTOS6

B.1 Overview

This appendix provides instructions on installing and configuring CentOS6 for Vaisala WR (IRIS & RDA) application software. Vaisala recommends reading through this manual before installing Linux OS and the Vaisala application software for the first time.

For more information see *CentOS Linux Installation Guide*, on the Documentation disk of your CentOS Desktop DVDs.

NOTE	During this process you must take notes so that you can properly reuse this information during the post installation modifications.

B.2 Installation Overview

Vaisala supports two installation methods:

- Automatic
- Manual

The **automatic** installation method uses bootable scripts located on special Install CDs available from Vaisala. The install CDROM is specific to a particular OS version, see our ftp site (ftp.sigmet.vaisala.com:/outgoing/releases) for the current list. If you wish to install a different version, use the manual method, or contact us. After installing the OS, you can separately install IRIS from the IRIS/RDA install media. While some manual steps are still required after

this automatic procedure, the time necessary to complete an IRIS/RDA installation on a new computer system is drastically reduced.

The **manual** installation method is documented here as an alternative in the event that there is a problem with the automatic installation, or if you wish to install a different version of the OS. It is written for an CentOS6 installation. There are differences with other versions, so some operator flexibility is required.

B.2.1 Using this Manual

This section uses the following format:

- **Screen** "Title", which indicates what you see on the installation wizard screen.
- **Action:** What to do

NOTE	Use the Tab key to move between different fields/options on the screen and the space bar to select check boxes.

B.2.2 Types of Installation Media

Installing Linux requires a Linux installation tree (Linux files) and a boot device. The Linux installation tree can come either from the local DVD–ROM labeled “32 bit Installation”, or a file accessible over the network (via NFS or FTP). Vaisala recommends a DVD–ROM based installation. For more information, see *CentOS Linux Installation Guide*.

B.2.3 Installation Preparation

Verify that you can boot from a DVD by powering off your computer system, inserting the Vaisala Install CD-ROM or the CentOS DVD (32–bit version) into the appropriate drive and then powering on your computer.

If a Linux screen is displayed on your screen continue to "Manual Installation" on page 113 for the automatic installation procedure or "Manual Installation" on page 113 for the manual procedure.

If a Linux screen was not displayed on your computer then continue with this section. When the computer is booting, you are prompted to "Press DEL to enter SETUP" (or some other key to enter setup). Press the specified key to enter setup.

Here is what to check: In the BIOS Features Setup, set the boot sequence to be "CD, C". Finally, save your changes by pressing the **F10** key.

The system reboots.

B.3 Manual Installation

Manual installation is typically used to install Linux and IRIS onto workstations that are not provided by Vaisala, that is, not RVP8 or RCP8 hardware. Note that the automatic procedure should always be used for RVP8 and RCP8 systems. The manual procedure described here can still take advantage of our automated post OS installation script (**sigconfig**) to perform system configuration functions.

B.3.1 Install CentOS6

If you have not already done so, place the CentOS DVD (labeled in small letters "32 bit Installation") into the appropriate drive and reboot your computer.

B.3.2 Welcome to CentOS6!

Purpose: Splash Screen

Action: Select **Install or upgrade an existing system**.

B.3.3 Disc Found

Purpose: Allow you to test the installation disk.

Action: Select **OK** if you want to test the install disk. This takes a long time, but we have found many bad discs over the years. Or select **Skip** if you are sure the disc is OK.

B.3.4 CentOS6

Purpose: Splash Screen

Action: Click **Next**.

B.3.5 Installation Language

Purpose: Select the installation language.

Action: Select your favorite language, then click **Next**.

B.3.6 Keyboard Selection

Purpose: Choose the keyboard type that you have purchased.

Action: For most systems choose **U.S. English**, then click **Next**.

B.3.7 Type of Device for Installation

Action: Select **Basic Storage Devices**.

B.3.8 Hostname

Action: Type in your host name, for example *wes–install.vaisala.com*, then click **Config Network**.

B.3.9 Please Name This Computer

Purpose: Set basic network configuration. You can do this later, but if you know the information, do it now. Consult with your network manager to get the information. An example is shown here:

1. From the **Network Connections** menu, in the **Wired** tab, select the device **System eth0**, and click **Edit**. The **Editing System eth0** window. appears. In this window do the following:
   a. Select the **Connect automatically** button.
   b. Select the **IPv4 Settings** tab. On this menu:

i. Set **Method** to **Manual**.

ii. Click **Add**.

iii. Type in your IP address, for example *192.168.45.208* and click **Enter**. It uses default the **Netmask**, (change if desired).

iv. Type in the Gateway IP address.

v. *Optionally*, type in the DNS server and domain name and click **Apply**.

6. Click **Close** on the parent **Network Connections** menu.
7. Click **Next** to leave the **Please name this computer** page.

B.3.10 Time Zone

1. Select the nearest city in your time zone. If you want your computer to use UTC for the system clock (good for shipboard systems, for example), then scroll down the list to find the “Etc/UTC” choice..
2. Select **System clock uses UTC**.
3. Select: **Next**.

B.3.11 Set Root Password

Enter the password for root (twice) and then click **Next**. The default Vaisala root password is “xxxxxxxx” (8 x).

B.3.12 What Type of Installation Would You Like?

Action: Select option 5 **Create Custom Layout** and click **Next**.

If you are going to record time series, we recommend that you create a separate partition for that purpose.

B.3.13 Please Select A Device

Action: Select your hard drive device from the list. Click **Create** four times, and make four partitions similar to this table:

```
sda1 16384MB / ext4
sda2 8192MB swap
sda3 16384MB /usr ext4
sda4 Fit max size /usr/iris_data ext4
```

It makes an extended partition for you, this is OK. Now click **Next**.

B.0.1 Boot Loader Operating System List

Action: Click **Next** to take the defaults.

B.0.2 Default Installation of CentOS

Action: Check **Software Development Workstation**. Leave default repositories. Select **Customize now** and click **Next**.

B.0.3 Package Group Selection

Purpose: Select the packages to install (☑) or not to install (☐). In some cases you will need to look at the "Optional packages" to select or de-select specific packages. Text in **bold** indicates changes from the defaults.

Base System

☐ Backup client

☑ Base

☑ **Compatibility Libraries**

☐ Console Internet Tools

☑ Debugging Tools

☐ Dial-up Networking Support

☑ Directory Client

☐ FCoE Storage Client

☐ Hardware Monitoring Utilities

☐ Infiniband Support

☑ Java Platform

☐ Large System Performance

☑ **Legacy UNIX Compatibility**
Optional Packages: Accept defaults, turn on **rsh**, **rsh-server**, **telnet**, and **telnet–server**

☐ Mainframe Access

☑ Network File System Client

☑ **Networking Tools**

☑ Performance Tools

☑ Perl Support

☑ Printing Client

☑ **Scientific Support**
Optional Packages: Accept defaults, turn on **lapack**

☐ Security Tools

☐ Smart Card Support

☐ Storage Availability Tools

☐ iSCSI Storage Client

Servers

☐ Backup Server

☑ CIFS File Server

☐ Directory Server

☐ E-mail Server

☑ **FTP Server**

☑ **NFS File Server**

☐ Network Infrastructure Server

☐ Network Storage Server

☑ **Print Server**

☑ Server Platform

☑ System Administration Tools
Optional Packages: Accept defaults, turn on **tree**

Web Services

☑ **PHP Support**

☐ TurboGears Application Framework

☑ **Web Server**
Optional Packages: Accept defaults, turn on **mod_auth_pgsql**

☑ **Web Servlet Engine**

Databases

☐ MySQL Database Client

☐ MySQL Database Server

☑ **PostgreSQL Database Client**
Optional Packages: Accept defaults, turn on **postgresql–jdbc**

☑ **PostgreSQL Database Server**

System Management

☐ Messaging Client Support

☐ Messaging Server Support

☐ SNMP Support

☐ System Management

☐ Web-based Enterprise Management

Virtualization

☐ **Virtualization Client**

☐ **Virtualization Platform**

Desktops

☑ Desktop

☑ Desktop Debugging and Performance

☑ Desktop Platform
Optional Packages: Accept defaults, turn on **qt–postgresql**

☑ Fonts

☑ General Purpose Desktop

☑ Graphical Administration Tools

☑ Input Methods

☐ KDE Desktop

☑ Legacy X Window System Compatibility
Optional Packages: Accept defaults, turn on **openmotif–2.3**

☑ Remote Desktop Clients

☑ X Window System

Applications

☑ Emacs
Optional Packages: Accept defaults, turn on **emacs_nox**

☑ Internet Browser

☑ Graphics Creation Tools
Optional Packages: Accept defaults, turn on **ImageMagick**

☑ TeX Support

☑ Technical Writing

Development

☑ Additional Development
Optional Packages: Accept defaults, turn on **libXpm–devel**, **libtiff_devel**, **openmotif–devel–2.3**, **tcl_devel**, **tk–devel**

☑ Desktop Platform Development

☑ Development Tools
Optional Packages: Accept defaults, turn on **ant**, **cmake**, **imake**, **rpmdevtools**

☑ Eclipse
Optional Packages: Accept defaults, turn on **eclipse–mylyn–cdt**

☑ Server Platform Development

Languages

Add languages that you want, the install language is implicit.

B.3.14 About to Install

Action: Click **Next**.

The install process will take about 20 to 40 minutes depending on the speed of your computer.

B.3.15 Congratulations

Action: Click **Reboot**. Make sure the CentOS6 disk is removed from the drive.

B.3.16 Welcome

Purpose: After the first reboot you will need to enter some customization information. You only need to do this once.

Action: Click **Forward**.

B.3.17 License Agreement

Action: Select **Yes I agree** and then click **Forward**.

B.3.18 Set Up Software Updates

Purpose: To register with CentOS. You can bypass this and you can do it later if needed.

Action: Click **Forward**.

B.0.4 Create User

Purpose: Create a user for the system.

Action: We will be creating the normal radar operator account later. We suggest you create an account for “service” here, make the password “xxxxxx” if you have no other preference, then click **Forward**.

B.3.19 Date and Time

Action: Set the date and time. Use your local time (depending on the timezone set earlier). Alternatively set your NTP servers here.

B.3.20 Kdump

Action: Leave **Disabled** and then click **Forward.**

B.0.5 Disable Firewall

After the install procedure has completed, you need to manually disable the firewall. You need to be logged in as root to do this. Run the following command:

```
# system-config-firewall
```

Click **Disable**, then **Apply**, then exit the program. If you are running the gnome desktop, you can launch system–config–firewall from the menu bar by selecting System/Administration/Firewall.

At this point, you must run the “sigconfig” post-install configuration script. Either follow the instructions in "Sigconfig Instructions for CentOS6 and 7" on page 127, or do it manually as described in "Post-Install Steps" on page 122

B.4 Post-Install Steps

B.4.1 Configuring Your Time Zone

If you used the automatic installation procedure or need to your time/date settings for another reason, as root, run:

```
# system-config-date
```

If you wish the system clock to display UTC, then in the “Time Zone” tab, look in the “Non-geographic timezones” to find “UTC”.

B.4.2 Basic Network Configuration

If you did not use the automatic installation procedure or need to change your network settings for another reason, as root, run:

```
# system-config-network
```

After you have made your desired changes:

```
# reboot
```

You can manually inspect and edit the various network configuration files. The ones required for IRIS are as follows:

File name	Function	Test
/etc/sysconfig/network	Set official local host name and basic networking.	`# hostname` Should show hostname exactly as as in the file.
/etc/sysconfig/network-scripts/ifcfg-eth0	Define the local IP address and the other basic network information	`# ifconfig eth0` Displays network configuration and status summary for device eth0.
/etc/hosts	Defines IP addresses, hostnames and aliases for all of the various IRIS or other network nodes.	`# ping <hostname or alias>` Shows that the hostname or alias corresponds to the proper IP address.

File name	Function	Test
/etc/hosts.equiv	A list of other hosts and the corresponding users who are allowed remote access without password.	`# rsh hostname date` Also required for rcp and rlogin.
/etc/resolv.conf	Specifies a network domain name server (DNS) as an alternative to a fixed */etc/hosts* table. Many IRIS systems do not use this feature.	If after login, X-windows takes a long time to start, then there may be a problem with the DNS. In this case move resolv.conf to /etc/resolv.conf.back.

The various files should look something like the examples below. Note that your specific node names and IP addresses, etc., will be different so check with your network manager to get these assigned.

/etc/sysconfig/network (should look something like:)

```
NETWORKING=yes
HOSTNAME=typhoon.sigmet.com
GATEWAY=192.168.76.10
```

/etc/sysconfig/network–scripts/ifcfg–eth0 (should look something like):

```
DEVICE=eth0
BOOTPROTO=static
BROADCAST=192.168.76.255
IPADDR=192.168.76.27
NETMASK=255.255.255.0
NETWORK=192.168.76.0
ONBOOT=yes
TYPE=Ethernet
```

/etc/hosts (should look something like):

```
127.0.0.1          localhost.localdomain   localhost
192.168.76.27      typhoon.sigmet.com      typhoon
192.168.76.28      otherhost.sigmet.com    otherhost
```

/etc/hosts.equiv (should look something like):

```
cloud.sigmet.com    operator
typhoon.sigmet.com  operator
```

```
others.sigmet.com   operator
```

Vaisala recommends the use of a static */etc/hosts* file. In this case, to avoid possible confusion with the DNS server, you should move the resolv.conf file as follows:

```
mv /etc/resolv.conf /etc/resolv.conf.org
```

If you plan to use DNS, then the resolv.conf should look something like (depending on your network):

/etc/resolv.conf (should look something like the following):

```
search sigmet.com
nameserver 192.168.76.10
```

After you have completed the networking, it is recommended that you reboot the system to test the changes. If you change the host name for example, you will need to reboot for this to take effect. For most other changes however you can test by simply stopping and starting the network service as follows:

```
Restart the network by typing;
service network stop
service network start
```

B.4.3 Routing

By default, a Linux system will not route network data. To enable routing, type the following command:

```
# echo 1 > /proc/sys/net/ipv4/ip_forward
```

Once you get this working, you need to make a change so this will run every time you boot. Do this by editing the */etc/sysctl.conf* and add a line like:

```
net.ipv4.ip_forward = 1
```

Or, you can put the echo command into your */etc/rc.d/rc.local* file.

B.4.4 Configuring NTP

To configure your machine to time sync with another machine, edit the */etc/ntp.conf* file to contain a single line similar to the following:

```
server 198.102.75.10
```

Substitute in the correct IP address of the machine to sync to. To make a computer the time server, use the special address as follows:

```
server 127.127.1.1
```

Ntp will set the time after approximately 15 minutes after building a time syncing model. This means that after booting, the time may change in about 15 minutes. This can cause problems with automatic startup of IRIS. To fix this problem, create a file */etc/ntp/step–tickers* and put in just the server IP address, without the word "server". Ntp will then set the date at boot time, if possible. Do not put in the step–tickers file on the time server.

If ntpd was not added, type the following:

```
# chkconfig --add ntpd
# chkconfig ntpd on
```

This will take effect after the next reboot. To start without rebooting, type:

```
# service ntpd start
```

It will take 15 minutes before it will sync the times. If the times are more than 10 minutes apart, ntp will assume there is an error and never change the time. To check on the status of ntp, type:

```
# ntpq -p
```

The first character before the server host will be "*" when it thinks it is time synced.

Another convenient check to compare the time of your workstation with that of another (such as the ntp server is):

```
# date ; rdate -p nodename
```

Note the semicolon between the two commands allows both the local "date" command to be run simultaneously with the remote date (rdate) command on the other workstation. This allows the times to be easily compared.

You can also manually set the time from another computer with the following command. This will not work if ntpd is running on your machine.

```
# ntpdate host
```

APPENDIX C

SIGCONFIG INSTRUCTIONS FOR CENTOS6 AND 7

C.1 Automatic Sigconfig Instructions

The sigconfig script installs the IRIS / RDA software and the supporting RPMs. From 8.13.6 release onwards, sigconfig simplifies the installation of extra RPMs by supporting yum group install. The following yum groups include the RPMs required by the IRIS / RDA software installation:

- Common Extras

  Includes RPMs that are needed by IRIS and RDA.

- RDA extras

  Includes RPMs needed by the RDA installation when using the rvp900, rcp8 or rda command line options.

- IRIS Extras

  Includes RPMs needed by IRIS installation process.

In releases prior to 8.13.6, you can enable yum repo by mounting the IRIS/RDA software media with the media volume label. The volume label is *irisrda_x.x.x* where x.x.x is the software release version (for example, 8.13.6).

In 8.13.6 release and newer, you can mount the IRIS/RDA software media with any mount point name, and the sigconfig script handles the yum repo to the correct location. By default when you insert the IRIS/RDA software to a DVD drive, or USB flash drive, it mounts to */run/media/username/irisrda_x.x.x*, where username is the login user, and x.x.x is the software release version. For example, for the root user it would mount at */run/media/root/irisrda_8.13.6* for version 8.13.6.

During the software installation, sigconfig backs up the yum repo files to the directory, */etc/yum.repo.d/repo.bck*, and creates a repo file for IRIS/RDA extras RPMS in */etc/yum.repo.d/*.

After sigconfig finishes the software installation, it restores the original repo files to */etc/yum.repo.d*, and deletes the IRIS/RDA Extras rpms repo file.

C.1.1 Overview to Running Sigconfig

The following sections provide detailed instructions for each step in using the sigconfig script to install the IRIS / RDA software.

CAUTION The sigconfig scripts overwrites the existing configuration. Do not run the script on systems with IRIS/RDA software already installed. Only run the script when installing IRIS/RDA software for the first time.

1. Install the operating system following the instructions provided in the user manual.
2. Locate the IRIS / RDA installation media or create the media if no media is already available.
3. Login as root.
4. Install the IRIS / RDA installation media and verify it mounts.
5. Run the sigconfig script at the mount point with the command line arguments for your application.
6. Reboot the computer
7. Verify expected services have started by logging in as radarop and running the ps_iris command.

C.1.2 Creating the IRIS RDA Installation Media

You can run the RDA IRIS installation process from a DVD drive or a USB stick.

C.1.2.1 Burning IRIS RDA ISO Image to DVD on Windows 7

1. Copy the IRIS/RDA ISO image to your Desktop.
2. Right-click the file, and select **Open with >Windows Disc Image Burner.**

   The **Windows Disc Image Burner** window opens.
3. Insert the DVD disk into the DVD burner drive.
4. Select **Burn**.

C.1.2.2 Copying IRIS RDA ISO Image to USB Flash Drive on Linux

1. Copy the IRIS/RDA iso image to your Linux workstation.
2. Login as root or switch to root user with the "su" command.
3. Run the "lsblk" command and take note of the output.
4. Insert USB flash drive into the USP port.
5. Re-run the "lsblk" command, and make sure you see an additional device list on the output, that is, the USB device that you just plugged-in earlier.
6. Transfer the IRIS/RDA iso image to USB flash drive with command, where X is the device number such as /dev/sdc:

   # dd if=irisrda_image.iso of=/dev/sdx bs=512

C.1.3 Logging in as ROOT

1. In the login screen displaying your user accounts, select **Not Listed?** below the user account login box.
2. Enter root as the user name and your root password.

The system displays a welcome message after the first time you log in and a blank screen after other logins.

C.1.4 Opening a Terminal Window

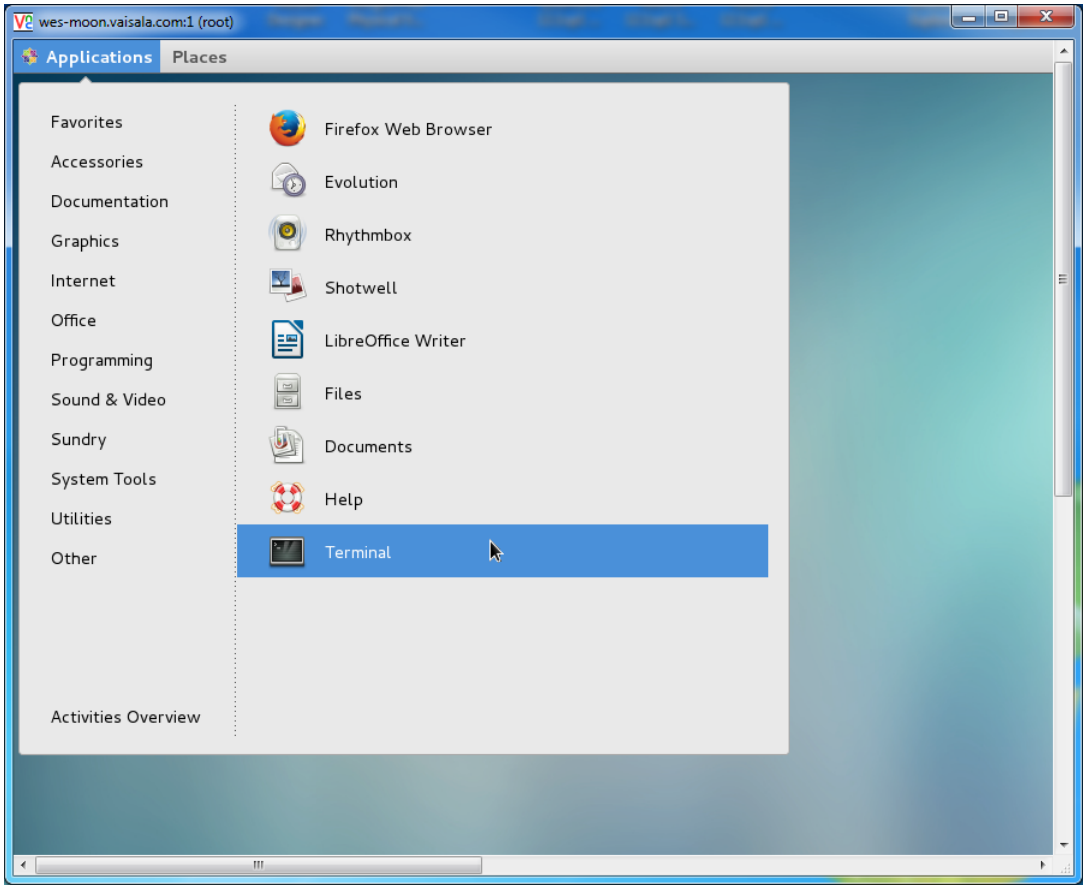


Figure 1 Terminal Window

1. Left-click the Applications menu in the upper left hand corner.
2. Move your cursor to highlight the terminal and select it.

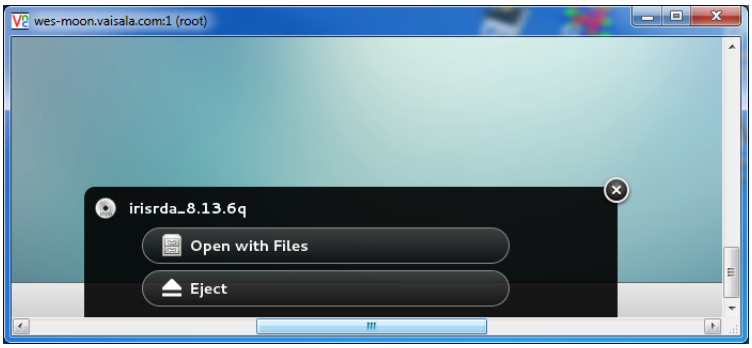
   A terminal window with a prompt opens.

C.1.5 Installing Media and Verifying Mount Point

IRIS / RDA installation media can be either a USB device or a DVD disc.

1. Either install the USB drive in the USB port or install the DVD disc in the DVD drive by pressing the eject button on the front to open the drive and gently pushing it shut to install the media.

2. If you are using a DVD drive, a small black window indicates that the DVD disc has been recognized. Press the X circle in the upper right corner of the window to close the window.



3. Verify that the installation media is recognized with the lsblk command:

   # lsblk

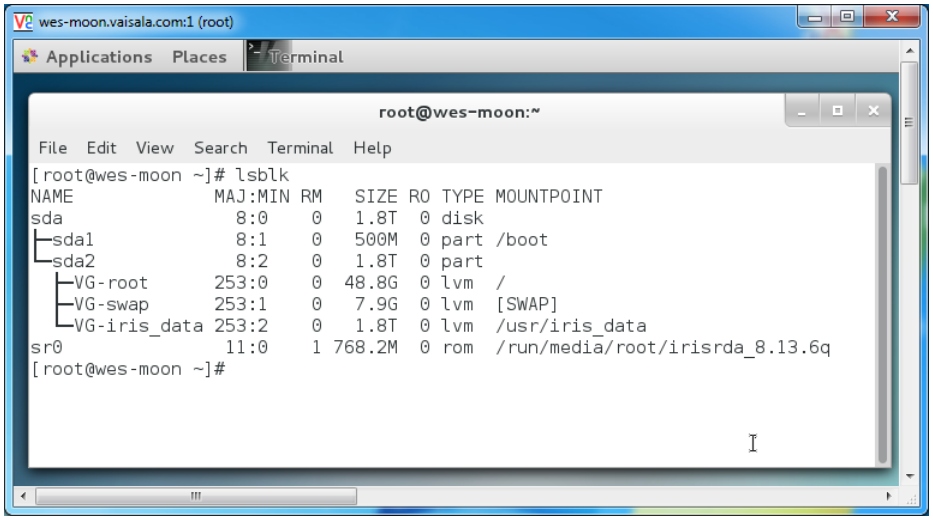
4. Check that you device is listed with the mount point:

   CentOS 6

   /media/irisrda_X.XX.X where X.XX.X is the version of software you are installing.

   CentOS /

   /run/media/root/irisrda_X.XX.X where X.XX.X is the version of software you are installing.



If you do not see this mount point listed you must manually mount the device.

C.1.5.1 Mounting IRIS RDA Media Manually

If the IRIS/RDA software does not mount automatically, mount it manually.

1. Create a mount point (directory).
   - If you are using a DVD disc, create a mount point at */media/dvd*:

     # mkdir -p /media/dvd

     # mount /dev/cdrom /media/dvd (For dvd)
   - If you are using a USB drive, create a mount point at */media/usb* where X can be a, b or c.

     # mkdir /media/usb (Use this mount point if using USB stick)

     # mount /dev/sdX /media/usb (For USB stick, x is the drive number).

     If you do not know what the USB drive number is on your system, use the lsblk command to list the block devices on your system. It is usually the last one on the list.
2. Verify the mount point is present with the lsblk command.

C.1.6 Running SIGCONFIG

NOTE	The following sections explain how to run sigconfig with CentOs7. If you are installing CentOs6 use the -6 argument instead of the -7 argument shown in the examples.

1. Change to the directory where IRIS/RDA media is mounted.

   For example if you automatically mounted your disc the mount point would be */run/media/root/irisrda_X.XX.X*. In this example it is version 6.13.6q

   # cd /run/media/root/irisrda_6.13.6q

   You should see sigconfig on the top directory.

2. Use the ls command to list the files and verify sigconfig is present.

   # ls

3. Use the sigconfig command with the desired options to run the sigconfig script and install the IRIS / RDA software:

   # ./sigconfig arg1 arg2 arg3 argn.

4. For a help menu of command line arguments, type sigconfig with no arguments:

   # ./sigconfig

C.1.6.1 Example: Install IRIS on CentOS 7 (auto start after system reboot)

./sigconfig -iris -7

Optionally, specify the install directory from the command line option using -instdir argument followed by the directory path.

C.1.6.2 Example: Install RVP900 on CentOS 7 (auto start on system reboot)

./sigconfig -rvp900 -7

C.1.6.3 Example: Install dual system (IRIS, RVP900, RCP8) on CentOS 7 (auto start on system reboot)

./sigconfig -rvp900 -rcp8 -iris -7

C.1.6.4 Example: Install RVP, and RCP on CentOS 7 (no auto start on system reboot)

./sigconfig -rda -7

Since there is no auto start for the services for this install option, start the service manually.

On CentOS 7, to start the service for rvp900, or rcp8, use the systemctl command

systemctl start rvp900

On CentoOs6, to start the service, use the service command. For example to start rvp900, the service command is:

service rvp900 start

Stop rvp900

systemctl stop rvp900

Start rcp8

systemctl start rcp8

Stop rcp8

systemctl stop rcp8

C.1.6.5 Checking Service Status

To check the service status, run:

systemctl status rvp900

systemctl status rcp8

C.1.7 Completing the Installation

When the installation has completed successfully, you are prompted to remove the installation media and "reboot".

1. Change directory to the root home directory and eject the media.

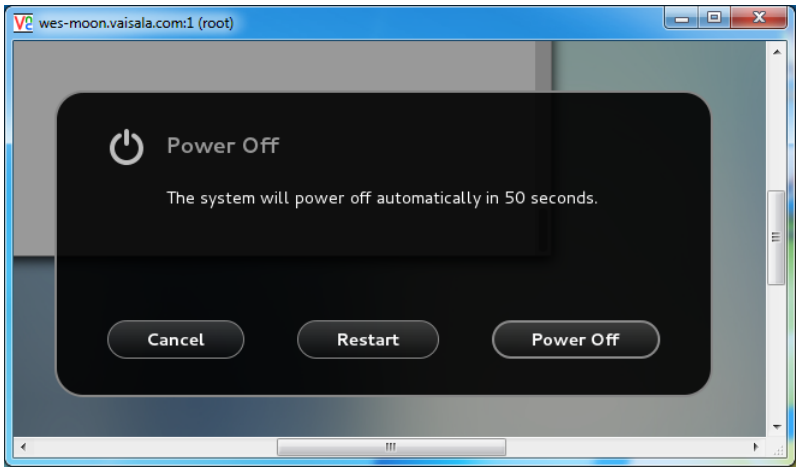
   # cd ~

   #eject

2. Physically remove the media from either the USB port or the DVD drive
3. Following the instruction in "Rebooting the Computer" on page 135.

C.1.8 Rebooting the Computer

1. Select the root button in the top right corner of the window.
2. Select **Power Off**.



3. Select **Restart**.

C.1.9 Logging in as RADAROP

The IRIS / RDA software installation creates two additional default user accounts: radarop and operator.

1. Log in as radarop to verify the expected services have started.
2. Select the radarop login icon and enter the default password in the password.

   Password: xxxxxx
3. Select **Next** in the series of welcome and initialization windows that appear the first time you log in
4. In the thank you window, select **Start using CentOS Linux**
5. In the GNOME Help window, select X in the right hand corner to continue.

C.1.10 Updating RVP9 (RDA) Firmware

In systems with RVP901 (RVP9IFDR), after installing IRIS / RDA software, you must upgrade the RVP901 firmware with the installed RDA software:

1. Follow instructions in "RVP8 and RCP8 (RDA) Software Installation" on page 37.
2. Verify that the expected services are running. See "Verifying Services Are Running" on page 136.

C.2 Verifying Services Are Running

1. Login as radarop.
2. In the terminal window user prompt use, ps_iris to list the services currently running:

   ```
   # ps_iris
   ```

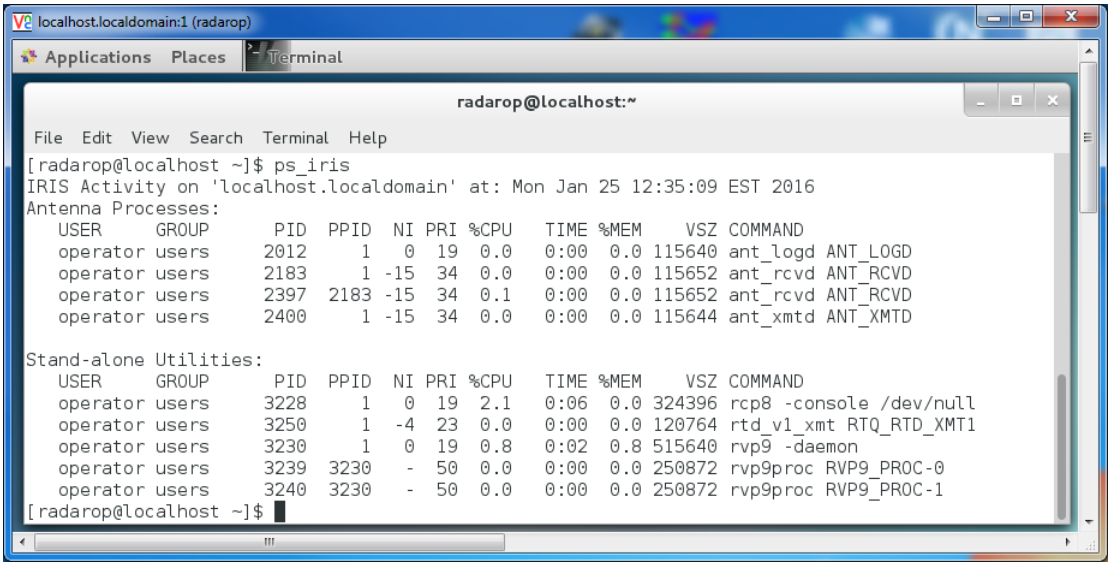
   If you are using CentoOs6, use the service command instead of the systemctl command. For example to start rvp900, the service command is:

   ```
   # service rvp900 start
   ```

The COMMAND column lists the running services. If you installed with the -rvp900 option, you should see the rvp9 service running and its two related rvp9proc commands.

If you installed with the -rcp8 option, you should see the rcp8 service.

You may also see the antenna (ant_*) and receive (rtd_*) process started.



NOTE	IRIS does not start until you have received and installed the IRIS license.

C.3 Manual Sigconfig Instructions

If the Automatic sigconfig procedure fails, you must install the RDA/IRIS software manually.

Before beginning the manual installation:

1. Login as root. See "Logging in as ROOT" on page 130.
2. Open a terminal window. See "Opening a Terminal Window" on page 130.
3. Check that you have the necessary RPMS installation media.

There are several RPMS not installed by the standard CentOs installation processes needed for the RDA/ IRIS software to operate properly. These RPMS are provided by Vaisala on the RDA / IRIS release DVD. If you do not have media and need to create it, see "Creating the IRIS RDA Installation Media" on page 129.

4. Install and mount IRIS / RDA Installation Disk.

   If the disk does not mount automatically, see "Installing Media and Verifying Mount Point" on page 131

C.3.1 Installing Additional rpms

1. Change to the RPM directory to verify that it is accessible

   In the rest of this section, this directory is referred to as $RPM_MOUNT_POINT.

   X.XX.X is a placeholder for the version of IRIS/RDA software you are installing, example 8.13.6.

   - On CentOs6

     # cd /run/media/root/irisrda_X.XX.X/CENTOS6/extras/RPMS/

   - On CentOs7

     # cd /run/media/root/irisrda_X.XX.X/CENTOS7/extras/RPMS/

2. Backup your current yum repository.

   # cd /etc/yum.repos.d

   # install -m 644 -d repo.bck

   # mv *.repo repo.bck

3. Check if the yum process is already running using the ls command.

   If the yum.pid file exists, kill the process and delete the yum.pid file.

   # ls /var/run/yum.pid

   # pkill yumBackend.py

   # rm -fr /var/run/yum.pid

4. Create an iris_rda.repo file

   a. Using emacs, vi or your favorite Linux text editor, create a new file named iris_rda.repo

   b. Enter the following text in the file,

[IrisRdaExtras]

name="Extra RPMs for IRIS/RDA"

baseurl=file://$RPM_MOUNT_POINT

enabled=1

gpgcheck=0

Be aware of white spaces in the formatting of the text. For the example above the baseurl line is:

baseurl=file:///run/media/root/irisrda_X.XX.X/CENTOS6/extras/RPMS/

c. Save the file.

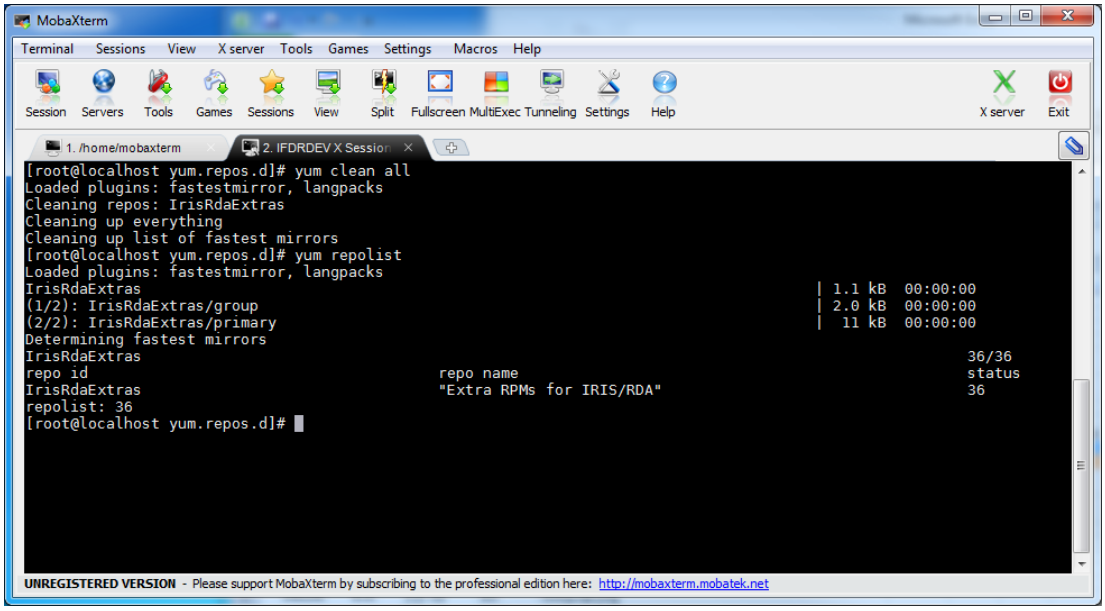
d. Clean yum repositories.

   # yum clean all

e. Verify that the new yum repository is present by checking that the text entered in the iris_rda.repo is displayed in the repo name.

   # yum repolist

   If you get warnings or errors, check for typos in the file.



f. Install the new RPMS

   # yum -y groupinstall "Common Extras"

   - If you are installing RDA Software:

yum -y groupinstall "Rda Extras"

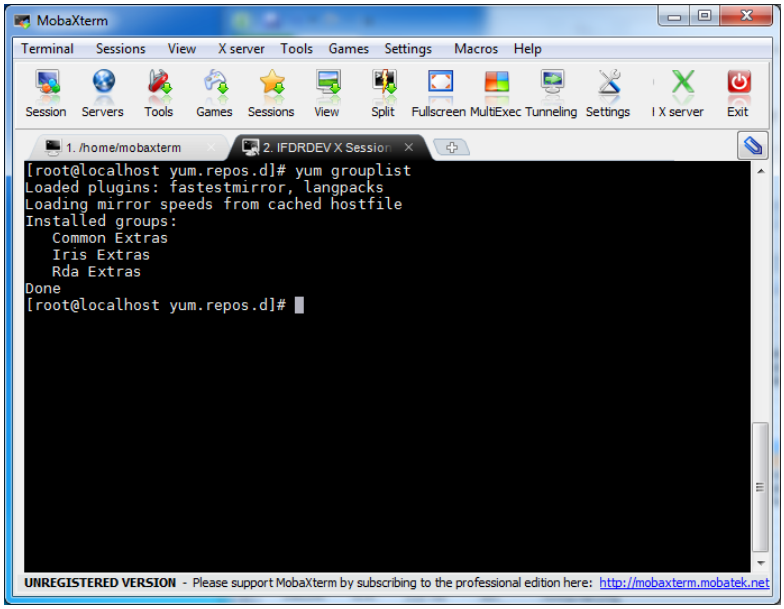
- If you are installing IRIS Software

  # yum -y groupinstall "Iris Extras"

g. Verify RPMS are installed.

   # yum grouplist

   Extras that are installed appear in the installed header area. Uninstalled Extras appear under the available header.



h. Cleanup the yum directory

   # rm -f /etc/yum.repos.d/*.repo*

   # cp /etc/yum.repos.d/repo.bck/*.repo /etc/yum.repos.d/

i. Save the yum settings to the cache /etc/ld.so.cashe file for future use

   # /sbin/ldconfig

C.3.2 Configuring User Accounts

Type the following commands to create accounts for the operator and observer users that are needed for IRIS, the RVP8 or RCP8.

1. Add radarop and observer user accounts.

```
# /usr/sbin/useradd -G users -m -u 1002 radarop
# /usr/sbin/useradd -G users -m -u 1001 observer
# echo 'xxxxxx' | passwd --stdin radarop
# echo 'xxxxxx' | passwd --stdin observer
```

2. By default, the Linux OS forces the use of "strong passwords". If you want to use simpler passwords, edit the file */etc/pam.d/passwd* so that it consists of only a single line:

   ```
   password required /lib/security/pam_unix.so
   ```

3. Save the file and exit.

   Users can now change their password to be weak or strong.

4. Modify the */etc/sudoers* file with user account information.

   You can use visudo or a text editor after changing file privileges. Vaisala recommends visudo as it checks the syntax.

   a. Define the services for sudo by adding the following line to the end of the file:

   - OnCentOs7

     Cmnd_Alias SERVICES = /sbin/service, /sbin/chkconfig, /usr/bin/systemctl

   - On CentOs6

     Cmnd_Alias SERVICES = /sbin/service, /sbin/chkconfig

   b. Add radarop account to sudo by adding the following line after services to radarop:

      radarop=(ALL) NOPASSWD: SERVICES

   c. Find the line that contains Defaults requiretty line and comment it out by adding a # to the first character in the line.

   d. If you use visudo and there is a syntax error when you save and quit, at the **What Now?** prompt, enter e to re-edit the file.

C.3.3 Creating IRIS Root and Data Directories

NOTE Vaisala recommends using */usr/sigmet* as the default root. If you choose another anchor point, note that the following sections use */usr/sigmet*.

1. To create this directory, login as root and type:

```
# mkdir /usr/sigmet
# chown operator:users /usr/sigmet
# chmod 6775 /usr/sigmet
```

Vaisala software requires a number of directories to hold the data that it generates. These directories may be anywhere within the file system. They have no connection with each other or with the */usr/sigmet* installation point. The directories are listed below.

`ascope`	Ascope data files
`input`	Generic pipe input
`ingest`	Acquired radar data in polar form
`log`	Error, status, and history messages
`product`	Normal product files from the product generator
`product_raw`	Raw product files from the product generator
`suncal`	Suncal results files are stored here
`tape_inv`	Tape inventories for quick retrieval
`temp`	Temporary storage used for network output
`zdrcal`	Zdrcal results files

2. Create the directories at the operating system prompt. Make sure the owner and group are set to match operator's default. For example:
   a. If /usr/iris_data does not already exist, create the directory.

      In CentoOs 7, directory should have been created as part of the automatic installation process.

      ```
      # mkdir /usr/iris_data
      ```

b. Change to the new directory and add the sub-directories

```
# cd /usr/iris_data
# mkdir ascope input ingest log product product_raw
# mkdir suncal tape_inv temp zdrcal
# chown -R operator:users ./
# chmod -R 6775 ./
```

C.3.4 Installing IRIS / RDA Software

Install the IRIS or RDA code from Vaisala media. See "New Software Installation" on page 13, or type the commands in this section.

1. Install the IRIS / RDA Software DVD. It should auto mount.
2. Change directory to installation directory.

   In the following commands, <8.13.6> is an example of the software installation version. If you are installing another version, replace 8.13.6 with your installation version.

   Centos6:

```
# cd /run/media/root/irisrda_8.13.6/CENTOS6/
```

   Centos7:

```
# cd /run/media/root/irisrda_8.13.6/CENTOS7/
```

3. Install IRIS and RDA software:

   - If installing IRIS only:

```
# cd iris

# ./instiris -files -root /usr/sigmet -new -manuals
```

   - If installing RDA only:

```
# cd rda

# ./instiris -files -root /usr/sigmet -new -manuals -rda
```

   - If installing both IRIS and RDA:

```
# cd iris

# ./instiris -files -root /usr/sigmet -new -manuals -rda

# cd /rda

# ./instiris -files -root /usr/sigmet -new -manuals -
nodelete -rda
```

C.3.5 Configuring Home Environments

Vaisala requires a number of "environment" files to be included in the /etc tree so they can be executed when users log in.

The files are read each time you login. Automatic startup programs only pick up changes after you reboot.

1. Change to the sigmet desktop directory:

```
cd /usr/sigmet/config_template/LINUX/desktop
```

2. Copy files to the home directory for each user:

```
# install -o radarop -g users mwmrc            /home/radarop/.mwmrc
# install -o radarop -g users bash_profile     /home/radarop/.bash_profile
# install -o radarop -g users Xdefaults        /home/radarop/.Xdefaults
# install -o observer -g users mwmrc           /home/observer/.mwmrc
# install -o observer -g users bash_profile    /home/observer/.bash_profile
# install -o observer -g users Xdefaults       /home/observer/.Xdefaults
```

- If installing IRIS only

```
# install -o radarop -g users xinitrc          /home/operator/.xinitrc
# install -o operator -g users xinitrc         /home/operator/.xinitrc
```

- If installing RDA or RDA & IRIS

```
# install -o radarop -g users xinitrc_mwm      /home/operator/.xinitrc
# install -o operator -g users xinitrc_mwm     /home/operator/.xinitrc
```

3. Logout of the computer and login as operator.

C.3.6 Authenticating RPC (CentOs 6)

In CentOS6, the rpc calls used to communicate over the network between programs get the error message “Cannot register service: RPC: Authentication error;”.

Fix this with the following command:

```
# echo “RPCBIND_ARGS=-i” > /etc/sysconfig/rpcbind
# service rcpbind restart
```

C.3.7 Raising Maximum Shared Memory

1. In a text editor, edit the */etc/sysctl.conf* file by adding the following lines at the end:

```
# Increase Shared Memory
sys.kernel.shmmax = 4294967295
```

C.3.8 Configuring RDA

For RDA systems only:

1. Save your Shared Runtime Library Path:

   ```
   # ldconfig -v
   ```

2. In a text editor, edit */etc/ld.so.conf* file to include the following lines at the end:

   ```
   net.core.rmem_default = 1000000
   net.core.rmem_max = 4000000
   ```

   This is needed for tsarchive and RVP900. Without these lines in the file, you get the following error message when RVP900 starts:

   ```
   could not set UDP receive buffer size to 1500000
   ```

3. Edit the */usr/share/hwdata/pci.ids* file.

   Look for the line“Altera Corporation”. Add the following lines so it appears as follows. Note that the indentations must be a tab, not spaces.

   ```
   7805 SIGMET RVP8/Rx IF Receiver
   7806 SIGMET RVP8/Tx IF Transmitter
   7807 SIGMET RVP/RCP 62-pin I/O Board
   ```

4. On RVP900, it is assumed that the second Ethernet port has been configured.

   If the second Ethernet port has not been configured, see "Configuring the System and Network" on page 88.

C.3.9 Configuring Sound (CentOs 6)

Edit the */etc/modprobe.d/dist-oss.conf* file to uncomment the lines starting with the `install` by removing the # from the beginning of the line.

C.3.10 Configuring for Automatic Startup

RVP900/RVP8/RCP8/IRIS application software can be configured to start automatically following a boot of the system.

In the Automatic Software Installation, this happens by default.

In the Manual Software Installation, this is an optional configuration. Depending on your configuration, type the following commands:

CentOS6

RVP900:

```
# chkconfig --add rdasys
# chkconfig --add antennad
# chkconfig --add rvp900
```

If not installing IRIS:

```
# chkconfig --add dspexport
```

RVP8:

```
# chkconfig --add rdasys
# chkconfig --add antennad
# chkconfig --add rvp8
```

If not installing IRIS:

```
# chkconfig --add dspexport
```

RCP8:

```
# chkconfig --add rdasys
# chkconfig --add antennad
# chkconfig --add rcp8
```

IRIS:

```
# chkconfig --add antennad
# chkconfig --add iris
```

CentOS7

RVP900:

```
# systemctl enable antenna.service
# systemctl enable rvp900.service
```

If not installing IRIS:

```
# systemctl enable dspexport.service
```

RVP8:

```
# systemctl enable antenna.service
# systemctl enable rvp8.service
```

If not installing IRIS:

```
# systemctl enable dspexport.service
```

RCP8:

```
# systemctl enable antenna.service
# systemctl enable rcp8.service
```

IRIS:

```
# systemctl enable antenna.service
# systemctl enable iris.service
```

On CentOs7, turn off the automatic offline software update functionality:

```
# systemctl stop packagekit-offline-update.service
# systemctl mask packagekit-offline-update.service
```

On CentOs7, use the following commands to turn off the automatic offline software update functionality:

```
# systemctl stop libvirtd.service
# systemctl mask libvirtd.service
```

On CentOs 7, the network manager may try to start before the Ethernet hardware is ready, causing a delay in initializing the hardware and bringing up link. As a result processes that depend on the Ethernet hardware may fail to start such as the rvp900 process. To prevent this from happening use the following command to allow the Network Manager to wait for hardware to be available:

```
# systemctl enable NetworkManager-wait-online.service
```

C.3.11 Rebooting the Computer

After installation and configuration are complete, reboot the computer for all changes to take effect.

See "Rebooting the Computer" on page 135 or use the poweroff command and restart the computer manually.

C.4 Operator List Defined in the Startup File

The file */etc/sigmet/profile.conf* defines some of the base configuration, including the lists of users who can operate IRIS fully, and who can observe its operation but not make any changes.

1. Edit the file and change these as needed. Note that every IRIS user must share group access to files owned by operator by being a member of the users group.

   ```
   operators='radarop operator john george mary root'
   observers='observer'
   ```

2. Check your environment by typing:

   ```
   $ env | grep IRIS
   ```

C.5 Configuring Services

C.5.1 Configuring Services for CentoOs6

To operate of old versions of IRIS, you must enable services such as those in */etc/xinetd.d: rlogin, rsh, telnet*.

1. Type the commands:

   ```
   # chkconfig rsh on
   # chkconfig rlogin on
   # chkconfig telnet on
   ```

2. Configure other optional services as necessary:

   - `gssftp` (sometimes called `vs-ftpd`)

3. Update the xinetd default configuration for receiving remote shell commands to at least 100.

   Edit the */etc/xinetd.d/rsh* file and add a line similar to the others in the "service shell" section, before the final "}":

   ```
   per_source = 100
   ```

   The default configuration for xinetd in Linux allows the receipt of a limited number of remote shell commands per minute. This limit is easily exceeded with a burst of network transfers between Vaisala systems. This can cause a network send request to be "aborted", and the network link to fail.

4. Enable your changes by rebooting the computer or by sending send the hup signal to inetd with the following command:

   ```
   kill -s hup /var/run/xinetd.pid
   ```

C.5.2 Configuring NTP Services

If you have configured the time sync server during the CentOS 7 installation, follow the instructions in "Configuring Time Sync With chronyd" on page 151.

If you have not yet configured the time sync server, you may follow the instructions in either "Configuring Time Sync With NTP" on page 150 or "Configuring Time Sync With chronyd" on page 151.

C.5.2.1 Configuring Time Sync With NTP

To configure your machine to time sync with another machine:

1. In the */etc/ntp.conf* file, update the lines that start with the word server by removing the default server lines and adding your own. For example:

```
# configure the servers for synchronization using ip
address or name

server 198.102.75.10 iburst

server 0.centos.pool.ntp.org iburst

# If you want to share your time with other machines on
the local network.

# Add the network range you want to allow to receive
requests

restrict 10.0.0.0 mask 255.255.255.0 nomodify notrap

# if there are no out side server then use this address
to use your local machine no matter how accurate.

server 127.127.1.1
```

2. NTP sets the time approximately 15 minutes after building a time syncing model.

   This means that after booting, the time may change in about 15 minutes, which can cause problems with IRIS automatic startup.

   To fix this problem, create a file */etc/ntp/step-tickers* and put in the server IP address, without the word "server".

   Ntp sets the date at boot time, if possible. Do not put the step-tickers file on the time server.

3. To have NTP start automatically on restart, type the following:

   CentOS6

```
# chkconfig --add ntpd

# chkconfig ntpd on
```

   This takes effect after the next reboot. To start without rebooting, type:

```
# service ntpd start
```

CentOS7

```
#systemctl enable ntpd.service
```

This takes effect after the next reboot. To start without rebooting, type:

```
#systemctl start ntpd
```

The system takes 15 minutes to sync the time. If the times are more than 10 minutes apart, NTP assumes there is an error and does not change the time.

4. To check on the status of ntp, type:

   ```
   # ntpq -p
   ```

   The first character before the server host is "*" when it is time synced.

5. To compare the time of your workstation with that of another (such as the NTP server), type:

   ```
   # date ; rdate -p nodename
   ```

   The semicolon between the two commands allows both the local "date" command to run simultaneously with the remote date (rdate) command on the other workstation, making it easy to compare the times.

6. To manually set the time from another computer, type the following command.

   ```
   # ntpdate host
   ```

   This does not work if ntpd is running on your machine.

C.5.2.2 Configuring Time Sync With chronyd

To configure your machine to time sync with another machine:

1. In the */etc/crony.conf* file, update the lines that start with the word server by removing the default server lines and adding your own. For example:

   ```
   # configure the servers for synchronization using ip
   address or name

   server 198.102.75.10 iburst

   server 0.centos.pool.ntp.org iburst
   ```

2. If chrony is already running and you would like changes to take effect use the following command:

   ```
   #systemctl restart chronyd.service
   ```

3. If you would like NTP to start automatically on restart, type:

   ```
   #systemctl enable chronyd.service
   ```

   This takes effect after the next reboot. To start without rebooting, type:

   ```
   #systemctl start chronyd.service
   ```

   The system takes 15 minutes to sync the time. If the times are more than 10 minutes apart, NTP assumes there is an error and does not change the time.

4. To check on the status of chrony, type:

   ```
   # chronyc sources -v
   ```

   The first character before the server host is "*" when it is time synced.

APPENDIX D

LINUX SYSTEM FILE LISTINGS

D.1 /etc/sigmet/profile.conf

```
install_root=/usr/sigmet
data_root=/usr/iris_data/current
network_port="TCP 30725"
operator=operator
operators="operator tester"
observers=observer
```

D.2 /etc/profile.d/sigmet.sh

```
# COPYRIGHT (c) 2007 BY
# Vaisala INC., WESTFORD MASSACHUSETTS, U.S.A.
#
PROFILE_CONF=/etc/sigmet/profile.conf
export IRIS_ROOT='grep -v "#" ${PROFILE_CONF} | \
grep -E "^[ ]*install_root[= ]" | \
sed -e "s/^[ ]*install_root[= ]*//"'
export IRIS_DATA='grep -v "#" ${PROFILE_CONF} | \
grep -E "^[ ]*data_root[= ]" | \
sed -e "s/^[ ]*data_root[= ]*//"'
export IRIS_OPERATOR='grep -v "#" ${PROFILE_CONF} | \
```

```
grep -E "^[ ]*operator[= ]" | \
sed -e "s/^[ ]*operator[= ]*//"'
export IRIS_NETRCV='grep -v "#" ${PROFILE_CONF} | \
grep -E "^[ ]*network_port[= ]" | \
sed -e "s/^[ ]*network_port[= ]*//"'
if [ -z "${IRIS_NETRCV}" ]; then
export IRIS_NETRCV="TCPIP 30725"
fi
if [ -z "${IRIS_ROOT}" ]; then
export IRIS_ROOT=/usr/sigmet
fi
if [ -z "${IRIS_DATA}" ]; then
export IRIS_DATA=/usr/iris_data
fi
if [ -z "${IRIS_OPERATOR}" ]; then
export IRIS_OPERATOR=operator
fi
export IRIS_OPERATORS="${IRIS_OPERATOR} \
'grep -v "#" ${PROFILE_CONF} | \
grep -E "^[ ]*operators[= ]" | \
sed -e "s/^[ ]*operators[= ]*//" \
-e "s/$IRIS_OPERATOR//" \
-e "s/\\"//g"'"
export IRIS_OBSERVERS="'grep -v "#" ${PROFILE_CONF} | \
grep -E "^[ ]*observers[= ]" | \
sed -e "s/^[ ]*observers[= ]*//" \
-e "s/\\"//g"'"
# The following variables reference the
source/release/configuration
```

```
# tree. These should all be rooted at the location where
IRIS has

# been installed.

#

export IRIS_APP_DEFAULTS="${IRIS_ROOT}/bin/app-defaults/"

export IRIS_BIN="${IRIS_ROOT}/bin/"

export IRIS_BIN_ACROBAT="/usr/bin/"

export IRIS_BITMAPS="${IRIS_ROOT}/dt/icons/"

export IRIS_CONFIG="${IRIS_ROOT}/config/"

export IRIS_IMAGES="${IRIS_ROOT}/config/images/"

export IRIS_INIT="${IRIS_ROOT}/config/init/"

export IRIS_KEYS="${IRIS_ROOT}/bin/keys/"

export IRIS_LISTINGS="${IRIS_ROOT}/config/listings/"

export IRIS_MANUALS_INST=
"${IRIS_ROOT}/manuals/IrisInstall.ilcab/instapdf/install/"

export IRIS_MANUALS_IRIS=
"${IRIS_ROOT}/manuals/IrisUsers.ilcab/irisupdf/irisug/"

export IRIS_MANUALS_IRISRAD=
"${IRIS_ROOT}/manuals/IrisRadar.ilcab/irisrpdf/irisrad/"

export IRIS_MANUALS_NOTE=
"${IRIS_ROOT}/manuals/relnotes.ilcab/relnopdf/relnotes/"

export IRIS_MANUALS_PROG=
"${IRIS_ROOT}/manuals/IrisProgram.ilcab/irisppdf/program/"

export IRIS_MANUALS_RCP02=
"${IRIS_ROOT}/manuals/rcp02_ug.ilcab/rcp02pdf/rcp02/"

export IRIS_MANUALS_RVP8=
"${IRIS_ROOT}/manuals/install_ug.ilcab/rvp8updf/rvp8user/"

export IRIS_MANUALS_RCP8=
"${IRIS_ROOT}/manuals/rcp8_ug.ilcab/rcp8updf/rcp8/"

export IRIS_MANUALS_RVP7=
"${IRIS_ROOT}/manuals/rvp7_ug.ilcab/rvp7updf/rvp7user/"

export IRIS_MANUALS_UTIL=
"${IRIS_ROOT}/manuals/IrisUtils.ilcab/irisupdf/irisutl/"

export IRIS_MANUALS_EXTRA="${IRIS_ROOT}/config/extraspdf/"
```

```
export IRIS_MENU="${IRIS_ROOT}/config/menu/"

export IRIS_NLS="${IRIS_ROOT}/bin/nls/C/"

export IRIS_OVERLAY="${IRIS_ROOT}/config/overlay/"

export IRIS_PIPES="${IRIS_ROOT}/config/pipes/"

export IRIS_SOUNDS="${IRIS_ROOT}/dt/sounds/"

# The following variables define where IRIS data are
placed. These

# must be separate directories, but need have no relation
among each

# other.

#

export IRIS_INGEST="${IRIS_DATA}/ingest/"

export IRIS_LOG="${IRIS_DATA}/log/"

export IRIS_PRODUCT="${IRIS_DATA}/product/"

export IRIS_PRODUCT_RAW="${IRIS_DATA}/product_raw/"

export IRIS_TAPE_INV="${IRIS_DATA}/tape_inv/"

export IRIS_TEMP="${IRIS_DATA}/temp/"

# Modify existing PATH variable to include IRIS_BIN, and
other useful

# directories. First add the platform-independent paths.

#

if [ -r ${IRIS_BIN}/hardware ] ; then

PATH="${IRIS_BIN}hardware:$PATH"

fi

if [ -r ${IRIS_BIN}/rda ] ; then

PATH="${IRIS_BIN}rda:$PATH"

fi

export PATH=".:/usr/local/bin:${IRIS_BIN}:$PATH"

LD_LIBRARY_PATH="${LD_LIBRARY_PATH}:${IRIS_BIN}/dynamic"

export LD_LIBRARY_PATH="${LD_LIBRARY_PATH#:}"
```

```
# Default umask kills group write, leaves all else
unchanged.

#

umask 002

# Allow local windows to display. If you want remote
displays,

# add them here also. The [ -z ] prevents from executing on

# non-graphical login. The /dev/null prevents text on
terminals.

[ -z "$DISPLAY" ] || xhost +localhost > /dev/null
```

APPENDIX E

PRINTER CONFIGURATION

IRIS lets you print menus, displays, and on-line documentation, as follows:

- Print the contents of a menu or a window by choosing **File->Print** from the IRIS menu or utility menu bar.
- Print products from the Product Output Menu by choosing **Device->** from the menu bar and selecting a printer from the pull-down list of devices.
- Print online documentation by choosing **File->Print** from the Acroread window.

This appendix gives you some hints on configuring printers to work with IRIS menus and utilities and the online document viewer.

E.1 Configuring Printer Queues for IRIS use

The IRIS software always generates printer output in Postscript format, thus the most important matter in printing is to make sure that you have a postscript compatible printer.

The next note on printers is that IRIS always prints using UNIX type print queues. This implies that the computer that you are running IRIS on has at least one print queue setup on it. To setup a print queue, you should use the system administration tool on your computer. In HP-UX systems, this is the **sam** utility. In Linux PC systems, this is the **printtool**. After making any changes in **printtool**, you must click "Restart LPD" prior to using the printer you just configured.

Print queues can be for one of three types of printer configurations. The first is a **local printer**. In this case the printer is connected directly to the computer with via a parallel port connection. Printing information goes

directory from the computer to the printer via the parallel port connection. The second queue configuration is for a **network printer**. In this case the printer is attached directly to the computer network. With a network printer, the printing information goes from the computer directly to the printer via the network. The third queue configuration is a **remote printer**. In this case the printer is connected up to another UNIX based computer either with a local or a network connection as described above. In this case, when a print job is executed, the printing information is first transferred over the network from the local computer to the remote computer. The remote computer then transfers the information to printer using the queue configuration configured (either local or network) on that remote computer.

E.1.1 Configuring a Local Printer Queue

Configuration for a local printer is the easiest — but perhaps not always practical. The reason why it is not always practical is that generally each computer does not have its own printer, but instead shares printers with other computers. None the less, sometimes you may have a local printer with a direct parallel port connection. In this case, merely configure the printer to be a local printer of type postscript using the system administration tool described above. During the configuration, you must specify a name for the queue and the parallel port to be used. At this point, when IRIS is restarted, it recognizes this printer and can print images to it.

Note that once a printer is configured locally on one computer, other computers can still use that printer by using a remote printer queue pointing back to this first computer. See the section on configuring remote printers for more information.

E.1.2 Configuring a Network Printer Queue

Network printers come in two different architectures. The first is referred to as "internal" and the second as "external". An internal architecture network printer has a network port (10/100 Base T) directly on the printer. An external architecture network printer is a printer with a parallel cable, and that parallel cable connects back to a hardware box called a "print server". The print server has the parallel port that connects to the printer and a network port (10/100 Base T) that connects to the network. The HP Jet Direct is a well known example of a print server product.

To configure your network printer (either internal or external), SIGMET recommends that you follow the instructions from the manufacturer. But generally these instructions have you either enter the printer configuration into the printer control panel, or to configure the printer through a network scheme such as BOOTP or TFTP. The main goal of this configuration step is so your printer can learn its Internet (IP) address. Again, refer to notes from your manufacturer to accomplish this step. Once this setup step is complete, you can use the **ping** command to test if the printer is recognized on the network.

Once the above is accomplished and your printer is recognized on the network, you must configure a print queue on your computer(s) to access it.

As is implied by a network printer, it is a shared device meaning more that one computer is capable of accessing it (via a queue). Configuration of a queue of a network printer depends on the type of platform you are configuring.

HP-UX: For HP-UX, you must install the optional Operating System software known as "**Jet Admin**" from HP. If the network printer you are installing is an HP, it is likely that this software was provided with the printer. If not, then the Jet Admin software can be downloaded from www.hp.com in the drivers section. This software can be installed with the HP-UX **sam** utility. Once the Jet Admin software is installed, you can use the **sam** utility to make a new printer queue of type "Network". During this process, you must specify the hostname or IP address of the printer and perhaps some other information depending on the installation circumstances.

Linux PC: For a Linux PC, it is not necessary to install any additional operating system software. To make a queue on a Linux system for a network printer, use the print manager that comes with the Linux **printtool**. Enter in a queue name. Specify the printer as a **Jet Direct** printer. Specify the **hostname or IP address** of the printer. Specify **postscript** as the filter type. Remember in **printtool** to save the information, then click "Restart LPD" prior to attempting to print.

Because Linux systems need no special operating system files to do network based printing, Linux requires the network printer to handle **LPD** type printing. Most network printers do handle this type printing, but if you are not sure, then check with your printer or print server manufacturer. HP Jet Direct printer and Lexmark network printers have been tested and do support LPD type printing.

It should be noted that once a printer is configured as a network printer on one computer, other computers can still use that printer by using a remote printer queue pointing back to this first computer. See the section on configuring remote printers for more information on this.

For Red Hat Enterprise Linux, standard DeskJet/Inkjet Printers can also be used. It is recommended that drivers be downloaded from:

http://hpinkjet.sourceforge.net

E.1.3 Configuring a Remote Printer Queue

Configuration of a remote printer queue relies on a local or network printer queue already being configured on another computer, and that other computer serve as a relay point for print jobs from your computer. To setup a remote print queue use the system administration utility on your system. On HP this is **sam**, and on Linux this is the **printtool**. In the setup, you must specify a local queue name. Choose a name of your choice, but often this is the same as the remote queue name. Enter in the hostname or IP address of the remote computer that serve as the relay point. Enter in the remote queue name which refers to the queue names as it is known on that remote computer.

E.2 Displaying Print Queues

On UNIX systems, you can display a list of printer queues by issuing the `sig_lpstat -listall` command. This command displays the queues that are available on the system. To get more detailed information about the status of the queues, the **lpstat -a** command can be used.

E.3 Configuring Printer Options

After you have worked with a menu, you may want to save the results to a postscript file or print the results for an archive of your IRIS system. Printed copies of IRIS configurations, product configurations, or schedules can be stored in a notebook to document how the system is used.

Printers are set up on a per-user basis. That way, users can send their results to the printers that are most convenient to them.

E.3.1 Printer Setup Menu

From any IRIS menu, choose **File->Print->Setup** to activate the Printer Setup menu.

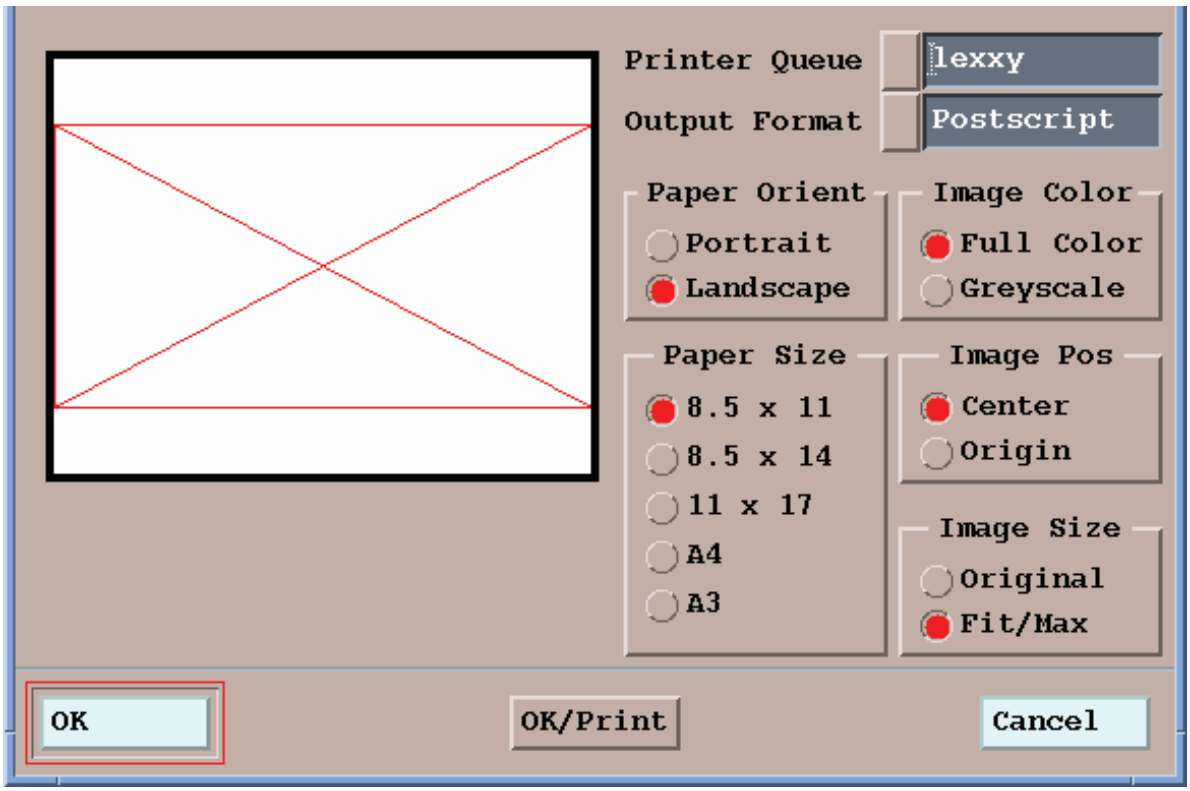


Figure 1 Printer Setup Menu

E.3.1.1 Printer Queue

Enter the printer queue directly in the Printer Queue test field or click the push button to choose from the pull–down menu. The pull menu can contain up to 4 queue names that are configured on your system. Queues must be created at Operating System level before they can displayed in the Setup Menu.

E.3.1.2 Output Format

The output format can be Postscript, GIF, of JPEG. If you have a postscript capable printer, then the postscript option provides control over more output options. The GIF and JPEG options are just graphic files and are best use with no postscript printers such as InkJets. The options for the

output when using GIF or JPEG cannot be set in the IRIS Print Setup tool, but rather must be configured using the operating system printer configuration tools.

E.3.1.3 Paper Orientation

- **Portrait** – Click on the toggle button to print the screen image vertically (↕) on the page.
- **Landscape** – Click on the toggle button to print the screen image horizontally (↔) on the page.

E.3.1.4 Image Color

- **Full Color** – Click on the toggle button for a full-color printout of your screen image. This option should be chosen for all full-color printers.
- **Greyscale** – Click on the toggle button for a grayscale printout of your screen image. This option should be chosen for all black-and-white printers. **Note**: You may choose this option if you are using a color printer and desire a grayscale printout of your screen image.

E.3.1.5 Paper Size

The Paper Size option is designed to print the screen image on the size of the paper that is loaded in your printer—sizes 8.5 x 11, 8.5 x 14, and 11 x 17 are US standards (inches) and sizes A3 and A4 are International standards (metric).

E.3.1.6 Image Position

- **Center** – Click on the toggle button to print the screen image in the center of the page.
- **Origin** – Click on the toggle button to print the screen image in the upper left-hand corner of the page.

E.3.1.7 Image Size

- **Center** – Click on the toggle button to print the screen image in the center of the page.
- **Origin** – Click on the toggle button to print the screen image in the upper left-hand corner of the page.

E.3.1.8 Printing Options

- **OK** – Click on the button to save the current settings.
- **OK/Print** – Click on the button to save the current settings and print a hardcopy of the the screen image (i.e. QLW, Setup, etc). If the OK/Print button is desensitized, a printer queue was not selected.
- **Cancel** – Click on the button to cancel any changes and ext the printer setup menu.

APPENDIX F
SIGBRU UTILITY

"**sigbru**" is Vaisala's manual/automatic backup and restore utility. This utility provides system administrators with an easy-to-use tool for creating and restoring backups from supported archive media. The supported media are:

- **DAT Tape**- HP SureStore DAT's are the most common and have proven to be very reliable.
- **HDD**- hard disk drive.
- **DVD**- DVD+RW is supported for writing backups. Use only media from well-known manufacturers such as SONY, Fuji or Memorex.

Note that **sigbru** is only one component of an effective backup strategy. Proper system documentation and advance preparation are essential in assuring that when (not if) your hard disk fails, you can easily resume operation. This chapter also includes recommended procedures for a comprehensive backup strategy.

sigbru is a graphical user interface which works in conjunction with Sigmet's **sigbrush** script file to allow easy archiving without having to know any of the sigbrush command line options. **sigbrush** interfaces with gnu's tar version 1.13.11 to give the tar utility even greater flexibility and control. The output is a "tar" file that is stored either on tape or disk. The tar file can optionally be gzip compressed.

One of the important features of **sigbru** is that it allows backups of a system to be made and placed on a tape or disk drive on another computer. The advantage of this is that the archive can be centrally located and the administrator can then backup systems to this one drive (typically a tape where he/she is sitting). Note that this requires a high-speed network connection, i.e., at least a T1 connection is recommended (1 megabit per second).

NOTE	DVD backup and restore is supported only on a local DVD drive.

A very powerful feature of **sigbru** is the automatic archiving feature. This allows a directory on disk to be monitored so that when a specified quota of disk space is reached, **sigbru** automatically archives the contents to the archive medium. One application is for use to archive non-IRIS products that are created by format conversion through an output pipe (the normal IRIS menu archive approach does not work for these).

F.1 System Configuration for sigbru

F.1.1 Authorization to login as root on a remote system

You can run **sigbru** either as root or operator. However, as operator you have reduced privileges such as not being allowed to restore at all, or not being able to do a full system backup which requires root access to various directories.

If you want to run **sigbru** on a remote computer using an xterm (or sigterm), the operating system protection may block your login as root. You would notice that even if you provide the proper root password, you are not allowed to login.

You can circumvent this problem by going to the remote system and then moving the security file to another name, i.e., on the computer that you wish to access:

```
# cd /etc
# mv securetty securetty.orig
```

Test that you can now do a remote login as root from a another system. You only need to do this once.

F.1.2 Authorization to use a remote tape drive or remote disk drive

NOTE	sigbru does not support backup and restore on a remote DVD. Only a local DVD can be used. sigbru does support use of both a remote tape drive and a remote hard disk.

If the computer that you are backing-up does not have a tape drive, you can back-up to a remote computer that does have a drive. You need to set-up special authorization file for this (*/etc/pam.d/rsh*). First, on the remote computer (with the tape drive) backup the old file and then use your favorite editor or "vi" to edit the file:

```
# cd /etc/pam.d
# cp rsh rsh.bak
# vi rsh
```

The file looks something like below. The exact lines vary by installation:

```
#%PAM-1.0
auth          required      /lib/security/pam_rhosts_auth
                            .so
auth          required      /lib/security/pam_nologin.so
account       required      /lib/security/pam_pwdb.so
session       required      /lib/security/pam_pwdb.so
```

Under the first line (which is commented with #) add the line:

```
auth          sufficient    /lib/security/pam_rootok.so
```

The edited file looks something like:

```
#%PAM-1.0
auth          sufficient    /lib/security/pam_rootok.so
auth          required      /lib/security/pam_rhosts_auth
                            .so
auth          required      /lib/security/pam_nologin.so
account       required      /lib/security/pam_pwdb.so
session       required      /lib/security/pam_pwdb.so
```

Save the modified file.

F.1.3 Archive Device and Media Configuration for sigbru

Sigbru supports three different archive devices:

- DAT Tape
- HDD Hard disk drive
- DVD+RW

The configuration of both the drive and the media for each of these is described below:

F.1.3.1 DAT for sigbru

The most common type of DAT used on IRIS systems is the HP SureStore. This comes in several versions (for example, version DAT 72). Make sure that you purchase tapes that are compatible with your hardware version.

In sigbru, the typical device names for DAT tapes are selected right in the menu. If this is not the correct selection for your system, you may type-in the correct device name. Check with your system manager if you are uncertain. Note that IRIS systems with tapes also input the device name in the setup/output/archive device menu so you can check there as well.

The privileges for the device should be set as follows (in the typical Linux case of the DAT device name */dev/nst0*)

```
chmod 666 /dev/nst0
```

DAT tapes for sigbru do not need to be initialized.

F.1.3.2 HDD for sigbru

You only need create a disk directory on the archive host you are using. Note that you can make this the local computer. Having and HDD backup on your local computer makes it very convenient to restore files, but is not a good idea for a full disk backup since you want to protect against failure of the disk itself.

To make the directory and set its privileges, become root and then, for the example of a directory named /iris_data/backups, type the following:

```
# mkdir /iris_data/backups
# chmod 666 /iris_data/backups
```

HDD directories for sigbru do not need to be initialized. Note that you can have several different backup files in this directory so it is not necessary to create a new directory every time you run sigbru.

F.1.3.3 DVD for sigbru

Only DVD+RW drives are supported so make sure that you have one of these (SONY makes a nice one that we use at SIGMET). First you need to determine the device name that has been assigned to the DVD by the Linux OS. To do this, as root type:

```
# cdrecord -scanbus
```

The operating system responds with many lines that look like:

```
...

scsibus3:

3,0,0 300) 'SAMSUNG ' 'CD-ROM SC-148C ' 'B100' Removable
CD-ROM

3,1,0 301) 'SONY ' 'DVD RW DRU-500A ' '2.0c' Removable CD-
ROM

3,2,0 302) *

...
```

Here we see the SONY DVD we are looking for. It's device name is */dev/scd1* which is taken from the middle of the three leading numbers, i.e., the "1" from 3,1,0.

Next set the protections as follows (continuing to use /dev/scd1 as the example):

```
# chmod 666 /dev/scd1
```

Now create symbolic link

```
# ln -s /dev/scd1 /dev/dvd
```

Then create a mount point for the DVD

```
# mkdir /mnt/dvd
```

Finally, initialize the DVD (essentially formatting the DVD):

```
# init_sigbru_dvd
```

F.2 Starting sigbru

NOTE	Important: sigbru is run on the machine that you want to backup / restore.

NOTE	Important: You must be root to do full sigbru backup and restore operations.

F.2.1 Command Line Options for Starting sigbru

sigbru has several command line options summarized below:

```
-help               Print this list.
-auto               Start Sigbru with
                    auto archive
                    options.
-enabled            Enable auto
                    archive function.
-include <dir>      Directory included
                    in archive.
-exclude <dir>      Directory excluded
                    from archive.
-compress           Enable gzip
                    compression.
-delete             Delete files after
                    archive.
```

-archivehost <hostname>	Hostname where archive device is located.
-quota <XXX.X>	Number of GB per each archive event
-device <device>	Name of archive device.
-display	Display name.

The meaning of each of these options is described in the subsequent descriptions of the **sigbru** menu fields.

F.2.2 Running from a Local Terminal Window (IRIS is installed)

On a local terminal window simply open a terminal as root on the system that you want to backup and then type:

```
# sigbru
```

If the system cannot find **sigbru** because the UNIX search path is not defined, then you can start **sigbru** by typing:

```
# cd /usr/sigmet/bin
```

```
# ./sigbru
```

If this does not find **sigbru**, then perhaps IRIS is not properly installed and you should use the cdrom method described below.

F.2.3 Running from a Remote Workstation (IRIS Installed on Target System)

From a remote machine, you can use the sigterm <hostname> command to open a terminal over the network. Then become super user and follow the "Local Terminal" procedure described above.

Alternatively you can rlogin or telnet to the machine that you want to backup, become root and then type:

```
# export DISPLAY=hostname:0.0
```

Here you substitute the hostname of the computer where you are sitting. You may also have to type the command "xhost +" on a terminal on your local display to allow the remote machine to display the **sigbru** menu on your screen.

F.2.4 If IRIS is Not Installed- Start sigbru from the CDROM

If you have not installed IRIS, then **sigbru** is not be installed. This might happen if you are doing a restore operation, that is, you need to restore IRIS and **sigbru**. In this case you can start **sigbru** directly from the SIGMET IRIS Release CDROM.

Insert the IRIS Release CDROM on the system where you want to run **sigbru**. Depending on your system you may need to mount the CDROM. See the instructions in the *IRIS Installation Manual*.

You can check that the CDROM is properly mounted by issuing the "df" command. This also tells you what the mount point is (assumed here to be "/cdrom" for the linux example. Be careful to use upper or lower case as indicated by df). Once the CDROM is mounted type the following to select the correct version of **sigbru** for you workstation:

```
# cd /mnt/cdrom/linux/sigbru
```

Then start **sigbru** by typing:

```
# ./sigbru
```

Now that **sigbru** is running, refer to the next section which describes the various features of the **sigbru** menu.

F.2.5 Copying the sigbru Files from a Local or Remote CDROM

You can copy the **sigbru** files to your system from either a local or remote CDROM. First create a directory on your local computer to hold the **sigbru** files. SIGMET recommends the following location:

```
# mkdir /root/sigbru
```

The CDROM must be mounted and the mount point (assumed here to be "/mnt/cdrom") must be properly specified. You can check both by issuing

the "df" command. Now copy the files that you need from the CDROM with the IRIS Installation disk, to this directory:

- For a CDROM drive on your local system:

```
# cp /mnt/cdrom/linux/sigbru/* /root/sigbru
```

- For a CDROM drive on a remote system,

```
# rcp nodename:/mnt/cdrom/linux/sigbru/* /root/sigbru
```

To start **sigbru** type:

```
# cd /root/sigbru
# ./sigbru
```

F.2.6 Copying the sigbru Files From Another IRIS System

You can copy the **sigbru** files to your system from another system on the network. The example here uses "rcp" (remote copy), but you could use ftp or NFS (via "cp") as well to do this. First create a directory to hold the **sigbru** files. SIGMET recommends the following location:

```
# mkdir /root/sigbru
```

Now copy the files that you need from the remote system that has IRIS (nodename) to your local system (careful with the rename of the first file from **sigbru** to sigbru.rf):

```
# rcp nodename:/usr/sigmet/bin/app-defaults/sigbru
/root/sigbru/sigbru.rf
# rcp nodename:/usr/sigmet/bin/sigbru /root/sigbru
# rcp nodename:/usr/sigmet/bin/sigbrush /root/sigbru
# rcp nodename:/usr/sigmet/bin/gnufind /root/sigbru
# rcp nodename:/usr/sigmet/bin/gnutar /root/sigbru
# rcp nodename:/usr/sigmet/dt/icons/hour32.bm /root/sigbru
# rcp nodename:/usr/sigmet/dt/icons/hour32m.bm /root/sigbru
```

To start **sigbru** type:

```
# cd /root/sigbru
# ./sigbru
```

F.3 The sigbru Menu

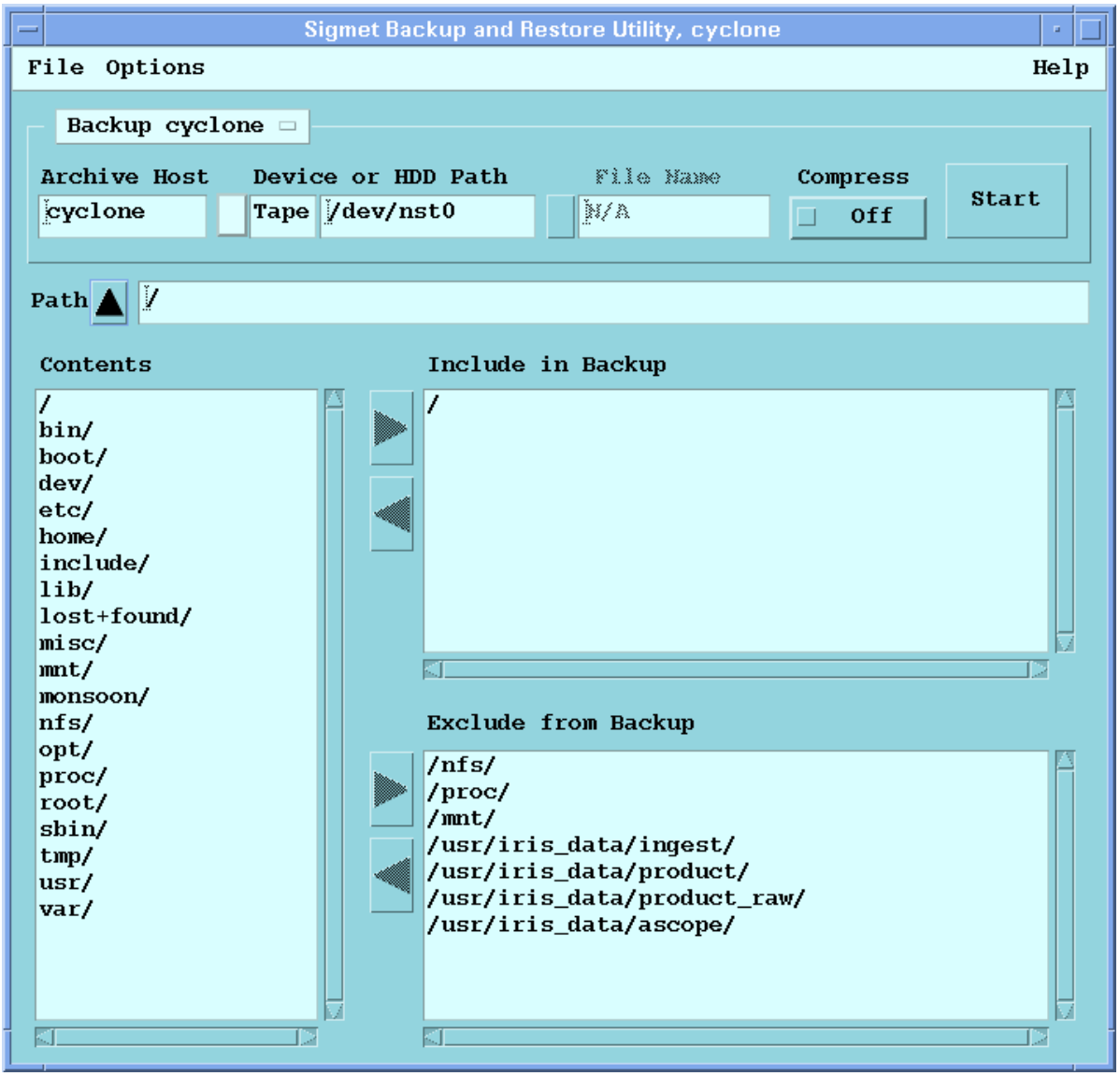


Figure 1 sigbru Menu

The **sigbru** user interface, shown in Figure 5 on page 208, allows you to define what files are moved to/from the archive media. *Remember, sigbru is run on the system where you want to backup/restore and you must be root to run sigbru*. A tape drive or HDD can be located on another system, however a DVD must be on the same system.

NOTE	To get the automatic archiving features of sigbru, use "sigbru -auto"

Figure 2 on page 177 shows the appearance of the top part of the sigbru menu for the case of restore operation.

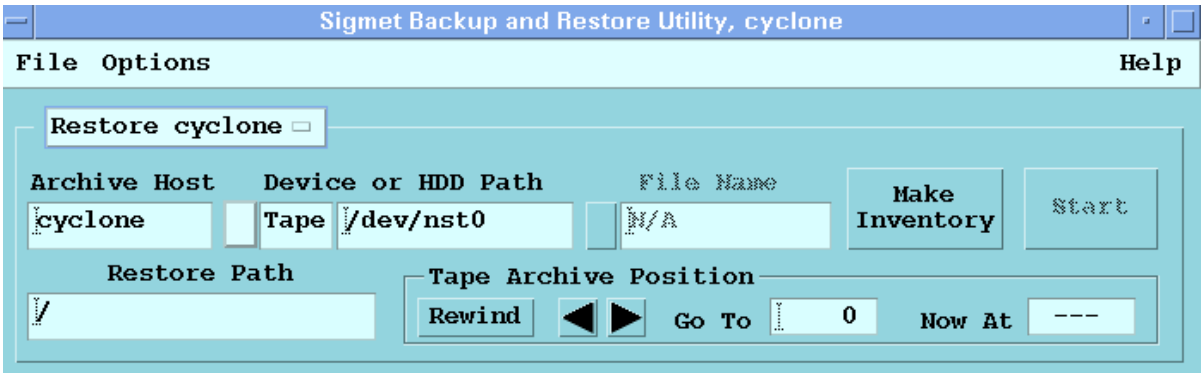


Figure 2 sigbru Menu (Top of Dialog Box)

The various menu fields are described below:

F.3.1 Title Bar

This identifies the network node name on which **sigbru** is being run. In the example, the node name is "cyclone". This is the hostname of the system that is be backed-up or restored.

F.3.2 File

The only option is "Exit". This is how **sigbru** is normally exited.

F.3.3 Options

This is used to manually start or view the status log window. The status log contains useful messages about the backup and reports any errors or problems.

F.3.4 Backup/Restore <host name>

Use this to select whether you are doing a backup or restore. The hostname of the computer is indicated as a reminder of what system is being used. The choice of Backup/Restore changes some of the other menu options. In the description of the various fields, both the backup and restore functions are indicated.

F.3.5 Archive Host (Backup and Restore)

Specify the network hostname where the archive tape or disk file is located. The tape or disk drive can be on another machine on the network. Note that the slower your network, the longer it takes to make the remote backup to another machine. SIGMET recommends a 1 MBit/sec line (T1) as a minimum.

Note that in the case of a DVD, the archive host is fixed to be your local workstation.

F.3.6 Device or HDD (Hard Disk Drive) Path (Backup Case)

First use the button to select the kind of media (DVD, HDD or Tape). For the case of "Tape" you are prompted to specify the type of UNIX that you are running HP-UX, IRIX, Linux). **sigbru** then automatically fills-in a device file name which would be typical for your system and in most cases work fine as is. However, depending on the specific configuration of your system, you may have to type in a different device file name. Check with your system administrator.

The example shown at the beginning of this section is the Linux device file name for a tape drive (the n specifies a non-rewind on close). If you select HDD or DVD, then you would type-in the filename that you want to use for the archive.

NOTE	Note on Tape Drive Device Name: SIGMET recommends using the device name corresponding to "no rewind on opening". For Linux systems, for example /dev/nst0. Use of a non-rewind tape device driver permits multiple archive or backup files to be placed on the same tape for both archive and restore functions.

If you store your archive in a DVD or HDD file, then you should use the following naming convention:

- *.gz for compressed files
- *.tar for uncompressed files

where the you would substitute a file name of your choosing for the *. For example, if you want to store a compressed backup in a directory called /tmp and you want to name it "back01" then you would type-in:

```
/tmp/back01.gz
```

For more information on backup devices and media please see "Archive Device and Media Configuration for sigbru" on page 170.

F.3.7 Device or HDD (Hard Disk Drive) Path (Restore Case)

In the case of doing a restore from an HDD or DVD, the button next to filename is activated. Click this to select among the archive tar files files in the specified directory. Then click the "Inventory" button to get a full listing of what is stored in the backup file.

F.3.8 gzip Compress (Backup only)

Click the button in for compression. Compression uses less space on the disk or tape archive, or, if you are using a remote networked tape or disk, compression allows for faster network transmission. The disadvantage of compression is that it does slow the archive process. For this reason, compression is recommended only for the following two applications:

When the backup would not otherwise fit on the tape or disk archive. In this case, your only choice is to use compression.

When you are using a remote tape or disk and network speed is the limiting factor. In this case it does not matter that the compression slows the archive process since the network transmission step is the limiting factor.

F.3.9 Make Inventory (Restore only)

Select **Update** to get an inventory of the files on the tape. In the case of multiple archive files on the same tape, the tape positioning features of the restore menu can be used to select the archive file.

When you perform an inventory, the Status display shows all of the files that are in the archive record. At the top of the list, is the date and time at which the archive record was written. This is generally useful, but especially useful for tapes on which there are multiple archive records.

F.3.10 Restore Path (Restore Only)

This specifies the starting path for the restore. In most cases this should always be set to "/" (the default). However, if you want to place files in a temporary directory (for example) so that you do not overwrite existing files, then you can type-in the directory name. For example, if you wanted to restore all files in the /usr/sigmet directory to /tmp/usr/sigmet, then you would enter /tmp in the Restore Path.

F.3.11 Path and Contents (Backup and Restore)

This field shows the current UNIX file path. Note that "/" is at the top of the UNIX file tree. Click the up arrow to go up a level. The files and sub-directories (indicated by trailing "/") in the path are shown in the left hand column labeled "Contents". You can double click on a sub-directory to go down a level. This is reflected in the "Path".

F.3.12 Include and Exclude from Backup (Backup Only)

You can select files to include in your backup by highlighting one or more files or directories in the "Contents" list and then clicking the right arrow

to put them in the "Include" list. You can highlight multiple files by click-dragging the mouse over consecutive files, or by holding the "Shift" key and clicking. If you select a directory to include, all files in that directory and in any subdirectories are included in the backup. The directory structure is preserved.

If you change your mind, you can highlight files and directories in the "Include" column and then click the left arrow to remove them from the list.

Similarly you can select files or directories to exclude from the backup, e.g., nfs directories exported from other machines.

F.3.13 Include in Restore (Restore Only)

In the Restore mode, first select the tape or disk file that has the backup archive and then click in "Contents" to highlight the files or directories that you want to restore. Use the right arrow to move them in to the "Include in Restore" list.

F.3.14 Tape Archive Position Features (Restore Only)

In some cases a single tape may contain multiple archive records from **sigbru** backups or archives written sequentially. This can result from either manual or automatic archive operations that were performed with a "non-rewind" tape device.

In restore mode, there is a tape positioning section to allow the user to control the archive record at which the tape is positioned. This is shown in Figure 3 on page 181:

Figure 3 Tape Archive Position (Restore Mode)

Rewind This is the first button you should click to select an archive file. The **Go To** and **Now At** fields show "1" when the rewind is complete.

<- (back) and -> (forward) arrow buttons decrement/increment the 1 the **Go To** archive record request field.

Go To Shows the current archive record request. Type-in a value or use the arrow keys to change this. You can change this "on-the-fly" even while a search is being made. If you did not first do a rewind, then the field shows only the relative position from where you started and the **Now At** field shows —.

Now At Shows at what archive record the drive is positioned at. When it matches the **Go To** field then the search is complete. Before a rewind, it always shows — since it is uncertain where the tape is positioned after startup.

When you reach the archive record number that you want, click the **Make Inventory** button to see what the archive contains. Check the archive record date and time at the beginning of the Status display after you do the **Make Inventory**.

NOTE Note on tape drive Device Name: SIGMET recommends always using the device name corresponding to "no rewind on opening". This is required for proper operation of the tape ositioning features (e.g., for *Linux /dev/nst0*).

F.4 Making System Backups for Linux Computers

NOTE The device file permissions for the tape drive must be properly set. As root type the following:

```
# chmod 666 /dev/st0 or nst0
```

While **sigbru** is useful in backing-up individual files and directories, it is best used for making full system backups in case you have a disk failure. Note that these system backups can also be used to restore individual files and directories. Here, we use the system backup as an example.

What are the Steps in Making a System ping Backup

There are two steps in backing up your system:

- Make a **sigbru** backup from "/", i.e., all of the files on your system.
- Document the disk partition information using fdisk and df commands (described in G.5 Documenting Your Linux Disk Partitions on page 101)

You need both of these to recover from the worst case- a disk crash.

F.4.1 When Should I Backup?

Certainly after you have completed and tested an IRIS upgrade or installed an IRIS patch you should make a backup. Also, if you have made configuration changes you may want to backup the system, or at least the /usr/sigmet/config directory. Routine backups should be made at least every other month (6 times per year), depending on the changes that are made on your system. Development systems may require daily backups.

F.4.2 What Should Go into a System Backup?

The idea behind a system backup is that all of the program files for your computer should be restored. Therefore the system backup should be made of the entire UNIX tree starting with "/".

F.4.3 What Should NOT Go into a System Backup?

Large data files should not be included. These simply take-up space and don't add anything. Also, NFS (Network File Sharing) directories should not be backed up since these are on other computers. The "df" command can be used to display NFS directories. The large data files that are part of IRIS that should be excluded are:

- `/usr/iris_data/ingest`
- `/usr/iris_data/product`
- `/usr/iris_data/product_raw`
- `/usr/iris_data/ascope (if used)`

Note that if you have clutter maps or special product or ingest files that are tagged with a "keep" bit, then you should archive these using the standard IRIS archive features. Ingest files must first be converted to RAW products. Alternatively you use the IRIS menus to delete all of the ingest and product files except for the ones that you want to save on the archive.

There are two other directories that should not be included in the backup, since they might cause your system to hang when they are restored. These are:

- `/proc`
- `/mnt`

On some systems, excluding `/mnt` automatically excludes a CDROM mounted at `/mnt/cdrom`. However, for some systems the CDROM may have be mounted at a point such as:

`/cdrom`

Check the df command to see if there is a CDROM on your system and make sure it is either unmounted or excluded from the backup. The example menu in "The sigbru Menu" on page 176 shows the exclusion of these directories.

NOTE Note: Even though you exclude directories, when you do a restore, the directory entries are restored but, the contents are empty. This means that you do not have to recreate excluded directories when you do a restore. However, you must recreate any subdirectories beneath them.

The step-by-step backup procedure:

1. Archive any special IRIS data files or delete the other data files

   Here you can convert ingest clutter maps to RAW products and then save them on tape or disk using the standard IRIS archive features. Also any other special products such as a RAIN1 clutter map or "kept" products can be archived as well. In this case you would exclude the four IRIS data directories from the archive.

The alternative is to use the IRIS menus to delete all of the ingest and product files that you do not need and then not exclude these directories, i.e., the special files would be included on the archive.

2. Stop IRIS before making the backup

   Do a qiris and a qant on the machine to be backed-up. Check that no IRIS processes are running by doing a ps_iris and "kill <process ID> any remaining processes. Note that you might have do a "kill -9 <process ID>"

3. Ready the Archive

   Put in fresh archive media. Make sure it is labelled with at least the text "Backup" and the hostname and date, and that a tape is not write-protected or, if you are archiving to a HDD, make sure that the directory exists and that there is enough space for the archive. You can estimate the size of the "/" backup by doing a "df -h" command for Linux or SGI systems or a "df -k" command for HP systems. Exclude any NFS directories or CDROM's from your size estimate.

4. Run sigbru on the machine that is to be backed-up

   - Start **sigbru** on the machine where the backup is to be made (of course you can do this over the network as described in G.2 Starting sigbru on page 88). *REMEMBER, YOU MUST BE ROOT TO RUN SIGBRU.*
   - Select the Backup <hostname> option.
   - Select your archive host and device name- typically a tape drive either on the local host or on the network. For best speed, use the local tape drive if one exists.
   - Select compression off unless the you are doing a networked backup or the backup would exceed your backup medium size..
   - Click the Up Arrow on "Path" to select "/". Highlight "/" in the contents and click the right arrow to "Include in Backup".
   - Exclude NFS directories:
   - Scroll down the contents list and find any "nfs" directories (check the "df" list). Note that NFS directories may not always be preceded by the text "nfs". SIGMET does not generally use NFS in its applications. Highlight them and click the right arrow to "Exclude from Backup". It is not recommended to exclude anything in /usr/sigmet.

- Optional: Exclude the large data directories in /usr/iris_data/, i.e., the subdirectories ingest, product, product_raw and ascope. Refer to discussion in Step 1.
- Exclude /proc, /mnt
- Exclude the CDROM (if necessary):
- Use df to identify any CDROM and its associated mount point (e.g., /cdrom). Note that if the CDROM is mounted at /mnt/cdrom. then excluding /mnt is sufficient.
- Click "Start" to start the backup.

The cursor changes to an hour glass shape and the only button that can be accessed is **Cancel.** Note that if you cancel, you do not have a valid backup and must start over. You can re-use the same tape and it rewinds automatically when you restart the backup.

The status log pops-up automatically and show the files that are being saved. At the end of backup, the log says "Backup Complete" and the cursor changes back to a pointer shape.

5. Write Protect, Label and Store your Backups

   When you remove the tape, slide the write protection tab on the tape to be in the protect position to avoid accidental over-writing. You should save several previous version (e.g., the last 6 months) of backups. This provides some assurance that if a backup fails for some reason and you need to restore, you have more than one. Old tapes can then be re-labelled and used for new backups.

   It is a good idea to store the backups in a location different than the computer.

F.5 Documenting Your Linux Disk Partitions

NOTE	Important: It is critical that you make a hardcopy print-out of your disk partition information using the fdisk and df commands. Without this, recovery of your disk in the event of failure is more difficult.

An important part of your backup documentation is to document your disk partitions. This does not have to be done every time that you do a system

backup, but it should be done when your system is installed or when you change the disk partitions. The results must be recorded *on hardcopy.*

F.5.1 Running df

First run the "df -h" command (as root). This shows the disks that are mounted and any CDROM or NFS directories. The -h option displays the disk usage in bytes ((G for giga and M for mega):

```
# df -h
```

```
[root@cyclone operator]# df -h
Filesystem   Size      Used      Avail     Use%      Mounted on
/dev/hda2    3.1G      1.8G      1.1G      61%       /
/dev/hda3    577M      490M      57M       89%       /usr/iris_data
/dev/hdb1    13G       9.6G      3.3G      75%       /usr/images
/dev/hdb2    4.4G      889M      3.5G      20%       /mnt/hdb2
haze-        2.4G      1.7G      492M      78%       /nfs/haze/usr/sigmet
gw:/usr/si
gmet
```

In the example above there are two hard disks, /dev/hda and /dev/hdb. There is also an NFS directory mounted at /nfs/haze/usr/sigmet which points to the /usr/sigmet directory on a different computer called "haze-gw". The "used" column tells you how many bytes (G for giga and M for mega) are actually used. This information is useful in determining if your backup fits on a tape. For example, if our backup is to be of "/" (/dev/hda2), then this requires us to store 1.8 GB on tape which is easily done for most tape backups.

You can store the results of df to a file by using a standard editor such as vi and pasting the output into the file. Alternatively you can automatically put the results in a file by typing:

```
# df -h > /root/filename.lis
```

The resulting file is stored in the root's home directory. To view the file type the command:

```
# cat /root/filename.lis
```

To print the file, type the command:

```
# lpr /root/filename.lis
```

If there is no printer on your system, the file can be sent to another computer (using rcp) for printing. As a last resort, record the results by hand. Store your hardcopy in a safe place.

F.5.2 Running fdisk

The fdisk command displays the partition table information used during the restore. Sizes are shown in 512-byte blocks. Convert to MBytes by dividing the block count by 2000. An example is shown below for a system that has two disks (hda and hdb). The example command is issued for /dev/hda. Your system probably does not look like the example.

```
# fdisk -l /dev/hda

[root@cyclone operator]# fdisk -l /dev/hda

Disk /dev/hda: 255 heads, 63 sectors, 524 cylinders
Units = cylinders of 16065 * 512 bytes

 Device     Boot       Start      End        Blocks     Id         System
 /dev/hda1  *          1          6          48163+     6          FAT16
 /dev/hda2             7          424        3357585    83         Linux
 /dev/hda3             425        500        610470     83         Linux
 /dev/hda4             501        524        192780     82         Linux
                                                                   swap
```

To store the results in a file named /root/fdisk.lis, use the command

```
# fdisk -l > /root/fdisk.lis
```

Use "cat" to view the file and "lpr" to print it as described in the previous section for the df command.

An example of a df listing is shown below. This is useful in showing you how much disk space is used to assist in sizing the required backup medium (that is, will your backup fit on the tape). The -h option displays disk usage in gigabytes and megabytes which is a more convenient.

You should make a hardcopy of the fdisk and df information The easiest way to do this is to grab the text into a file and then print the file. If you do not have a printer you could send it by email to somebody who does or, as a last resort, copy it by hand.

F.6 Documenting Your Basic Network Configuration

NOTE	You may need basic networking support to restore your system. For example, you may need to use a tape drive on another system to restore files over the network. It is critical that you make a hardcopy of your basic network configuration information so that you can get your network back up after a disk failure. Without this, recovery of your disk is more difficult.

This is done on Linux systems by running the netconf utility. As root type the command:

```
# netconf
```

When the netconf utility screen appears (in either text or X-Window mode), select "Basic Host Information" for your network adapter (usually adapter 1). Record ALL of the information by hand (including the button positions) or use "xv" to make a print-out of the menu. An example is shown in Figure 4 on page 190. The information for your system is different. After you have copied the information, exit netconf without activating any changes.

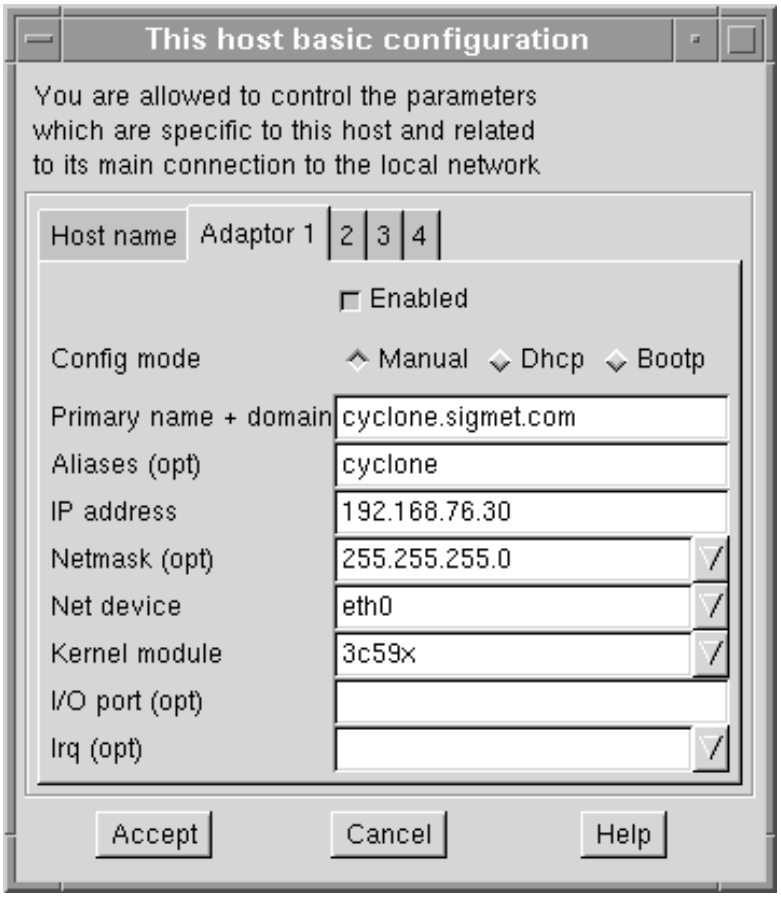


Figure 4 Basic Host Information Dialog Box

NOTE	The kernel module for RxNet7 customers is smc9194.

F.1 Selected File Restore Functions

Disk files can become corrupted accidently by users or by malfunction of the disk. The worst case is when the entire disk fails and a new disk must be installed. In all these cases, having a backup archive makes it much easier to resume operation since the software does not have to be installed from scratch and then completely reconfigured.

There are two basic restore scenarios:

- Restoration of selected files and/or directories.
- Full disk recovery

This section discusses the recovery of selected files or directories. It is assumed that your computer is basically working and that the disk does not have to be repartitioned and the operating system re-installed. G.8 Linux Disk Restore Functions on page 106 discusses the Linux recovery procedures in the event that the disk fails and you have to reinstall the operating system.

In this example, we shall assume that the */usr/sigmet/config* directory is to be restored. Perhaps some of the IRIS configuration files (for example, TASK Configuration, overlays, etc.) have been inadvertently changed by an inexperienced operator. Restoring the entire directory can sometimes be easier than trying to figure out what the operator has done.

1. **Locate backup**

   Identify the backup (tape or disk file) that you want to use. Here is where proper labelling and storage are important. It is also useful to keep a log of the backups identifying any system changes that are in the backup.

   If you are using a tape, make sure that the tape is write-protected and insert the tape into the drive. Note that the drive can be on another system.

2. **Stop all IRIS processes**

   Since you are restoring the */usr/sigmet/config* directory which has IRIS configuration files, you need to stop ALL IRIS processes. Do a qiris and qant to do this. Check by doing a ps_iris and manually do a "kill <process ID>". You may have to be root to kill some processes or do a "kill -9 <process ID>". Recheck with ps_iris that all processes have indeed been stopped (nothing reported back).

3. **Start sigbru as described in**"Starting sigbru" on page 172

   Start **sigbru** from a terminal by typing "sigbru" as root, or start it from the CDROM is described in "Starting sigbru" on page 172. Note that if you do a ps_iris now, you will see sigbru, but this is OK. *REMEMBER, YOU MUST BE ROOT TO RUN SIGBRU*.

4. **Select Restore in the sigbru menu**

5. **Select Archive Host, Archive Device Name and Make Inventory**

   During the "Make Inventory" process, the status window shows a growing list of files that are on the archive. After the inventory is completed, the top level directory appears in the "Contents". The message "Retrieving Dirs and Files Complete" is displayed in the status log.

6. **Select the Retrieve Path (default is /)**

   Here you almost always want to use "/". One reason not to would be if you wanted to restore some files and then selectively copy them to another directory. For example you might want to restore an old version of */usr/sigmet/config* to another directory (e.g., */tmp/usr/sigmet/config*) so that you could later select some config files to copy into the /usr/sigmet/config directory.

7. **Select the files or directory to restore**

   In this example (restoring */usr/sigmet/config*) you would select directories until "*/usr/sigmet*" appears in the Path and then highlight "*config/*". Click the right arrow to "Include in Restore".

8. **Click "Start".**

   The cursor changes to an hour glass shape and the status log appears. You can monitor the progress of the restore in the status log which shows the files that have been restored. Any errors during the restore pop-up in a separate error window. When completed the status log shows "Restore Complete".

   The Cancel button can be used to stop the restore before completion.

F.7 Linux Disk Restore Functions

F.7.1 Disk Restore Overview

Eventually it will happen- your hard disk will fail. Repairing the hardware failure is as easy as putting in a new disk, but now you must format the disk and reload and configure all of the software. Installing and configuring the operating system and IRIS can be very time consuming unless you have prepared in advance with a proper backup strategy.

Here are the things that you need in order to restore the system using sigbru:

- Your Red Hat distribution CDROM. The version must match the version that was backed-up by sigbru.
- A hardcopy of the disk partition information that you collected (see "Documenting Your Linux Disk Partitions" on page 186)
- The IRIS release cdrom (this has **sigbru** on it).

- Your **sigbru** system backup (from "/") of the failed disk.

Here we assume the worst case- that your disk has crashed and you need a new one. You need a disk that is the same size or larger than the one that failed.

- **Step 1:** Use the Red Hat Linux CDROM to get a basic version of the operating system installed on a "mini-root" partition, i.e., a small disk partition to hold a temporary version of the operating system.
- **Step 2:** Create a large "main" partition and restore the files from your **sigbru** backup of "/" to the main partition.
- **Step 3:** Swap the system to boot from the main partition. Keep the mini-root partition for possible future use.

Step 1 gets your system up and running on the mini-root partition. Step 2 restores to the main partition all of the files on the backup. This recovers any customization that you performed for IRIS and Linux. Step 3 gets the system booting off the large partition.

NOTE

Important: The mini-root partition may already be installed on your disk. You can check this by typing "miniroot" (the standard SIGMET name) at the LILO boot prompt and see if your system boots. If you do not get a LILO boot prompt or the system does not boot then you must install the mini-root. If the system boots the miniroot, then skip to Step 2 in "Step 2: Restore the sigbru backup to main partition" on page 196.

F.7.2 Step 1: Basic Linux Installation into a Mini-Root Partition

F.7.2.1 What You Need

You need to have your Red Hat LINUX CD and the hardcopy listing that you made of the basic system configuration:

- The file system information from df: see "Running df" on page 187
- The disk partition information from fdisk: see "Running fdisk" on page 188

- The basic network configuration information from netconf: see "Documenting Your Basic Network Configuration" on page 189
- Basic knowledge of the use of the vi editor.

For this procedure, you need to be able to use the "vi" editor.

F.7.2.2 Installing Linux

The restore procedure described here assumes that your computer can boot from CDROM. Turn on the computer and immediately insert the Linux release CDROM into the drive so that the computer boots off the CD. At this point, we shall install the basic Linux operation system.

Follow the usual steps, selecting "Text" style installation menus and a "Custom" installation. The exceptions to the installation procedure for installing the mini-root partition are:

- For the disk partitioning step, delete all partitions and then create a 200 MB Linux partition with the mount point "/". This is the "mini-root" partition. Also, create a 128 MB Linux swap partition (or use the size of the swap partition that is documented in your fdisk hardcopy, see "Running fdisk" on page 188).
- When you are prompted for what packages to install, select only "Networked Workstation". This allows you to set up networking on your system in case you need to use the network for the restore operation. When prompted for the network node name, use the node name that is documented in your hardcopy of the basic network information (see "Documenting Your Basic Network Configuration" on page 189).

The installation does not take very long since there is not much to install. When it is done, the computer reboots automatically. Be sure to remove the CDROM before the reboot so that the system boots from the mini-root partition.

After reboot from the mini-root partition, the only post-installation step that you need do is install the "k-shell" which is used by the **sigbru** restore utility. Follow the *IRIS Installation Manual* steps for installing "pdksh..." using the the RPM post installation step.

If you are on an RxNet7 and plan to use a local tape drive for the restore, you can do a shutdown (# shutdown -h now) and connect the SCSI tape drive by daisy-chaining it on the CDROM. Be sure that the tape and CDROM both have unique SCSI addresses set via switches on the back.

Also be sure that the last SCSI device on the chain has a terminator or else the system cannot work reliably (or perhaps at all).

F.7.2.3 Setting-Up Basic Networking (Optional)

Note that if you have a local CDROM and a local tape for the restore, then you do not need to do this step. If you need to do this, run netconf as root and provide the basic host information from your hardcopy documentation (see "Documenting Your Basic Network Configuration" on page 189). Reboot the system. You must edit two files to allow you to access the other machines on the network that you might have to use (e.g., the one with the tape drive or the copy of sigbru).

```
/etc/hosts
```

This file has the list of node names and IP addresses. Be sure to check that your "alias" is specified- the short version of your node name without the domain name. After you have done this, test with the "ping" command, i.e. type:

```
# ping nodename
```

where *nodename* is the name of the computer(s) that you configured in /etc/hosts.

The next step is to configure the file:

```
/etc/hosts.equiv
```

This file is a list of computers who are authorized to use your system.

You can look on other systems on the network to see examples of these. Remember, you probably only need to have entries for one or two other systems.

You must also make sure that the corresponding /etc/hosts and /etc/hosts.equiv files on the remote computer that you access include the computer that must restore. For example, if you are going to use a tape drive, cdrom or copy files from a node called "cyclone", make sure that the /etc/hosts and /etc/hosts.equiv files on cyclone contain entries for the target local computer that will be restored. Since you are restoring to a computer that was originally on the network, there is a good chance that these files are already configured on the other network computers.

F.7.3 Step 2: Restore the sigbru backup to main partition

Creating and mounting the main partition

First we need to create the main partition. This only need be done once. In the mini-root run fdisk as root:

```
# fdisk /dev/hda
```

In fdisk issue the "p" command to view the partitions. You should see three partitions as shown in the example below:

Disk /dev/hda: 66 heads, 63 sectors, 1018 cylinders

```
Units = cylinders of 4158 * 512 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/hda1	*	1	99	205789+	83	Linux
/dev/hda2		100	1018	1910601	5	Extended
/dev/hda5		100	163	133024+	82	Linux swap

In the example, /dev/hda1 is the "mini" partition. /dev/hda2 is an extended partition. This is available to add logical partitions, or can be removed and this space repartitioned. At this point, you should use the features of fdisk to repartition the disk according to the hardcopy documentation that you obtained during your backup procedure (see "Running fdisk" on page 188). **However, you must not remove or change the mini-root partition or your system will not be bootable**.

NOTE If your main partition had already been created (e.g., you are restoring a system that was already configured with main and mini-root partitions) then you can skip the next creation step and start the procedure with the "mkfs" (make file system) step below.

A simple thing to do that serves most systems is to create a logical partition within the extended partition. Do this with the "n" command. Make the partition start after the swap area and use the entire disk, e.g., start at 164 and end at 1018. Do not specify a mount point. When you are

done, use the "w" command to write the partition information. The "p" command will then show (for example):

```
Device      Boot   Start   End      Blocks     Id    System
/dev/hda1   *      1       99       205789+    83    Linux
/dev/hda2          100     1018     1910601    5     Extend
                                                 ed
/dev/hda5          100     163      133024+    82    Linux
                                                 swap
/dev/hda6          164     1018     1777513+   83    Linux
```

The "main" partition is /dev/hda6.

.At this point you must reboot the system by issuing the command:

```
# reboot
```

After the reboot you must make the file system on the main partition (/dev/hdaN would be /dev/hda6 in the example):

```
# mkfs /dev/hdaN
```

Finally create the mount point and mount the file system:

```
# mkdir /mnt/hdaN
# mount /dev/hdaN /mnt/hdaN
```

F.7.3.1 Restoring the sigbru Backup to the Main Partition

For this step you will need two things:

- A copy of **sigbru** programs. These can be found on the IRIS release CDROM. For Linux systems, these are in /mnt/cdrom/linux/sigbru. The CDROM can be local or, if you do not have a CDROM on the local system, you can copy the files from another IRIS computer on the network.
- Your **sigbru** system backup tape which are on either a local or remote tape drive.

There are several restore scenarios corresponding to the different combinations of the above (i.e., local/networked IRIS release CDROM or local/networked **sigbru** backup tape). The easiest and fastest case is that of restoring from a local CDROM and a local tape drive.

In the case of using either a networked CDROM or tape drive, you must set up some minimal networking on the target machine that is being restored. Networking needs to be installed as part of Step 1 (the Linux installation).

All of the procedures below assume that the **sigbru** backup is the full disk image (from "/" with /proc and /mnt excluded). We restore the backup to the main partition mounted at /mnt/hdaN where N is the number of the partition (viewed via df).

If the main partition is not mounted then mount it with (see previous step):

```
# mount /dev/hdaN /mnt/hdaN
```

F.7.3.2 Local Tape and Local CDROM

Insert the system backup tape (write-protected) into the local tape drive and the SIGMET IRIS release CDROM into the local CDROM drive (this has the **sigbru** command utility on it). Next perform the following steps as root:

```
# cd /mnt/hdaN (hdaN is the number of the main partition
from df)
# /mnt/cdrom/linux/sigbru/sigbrush -extract -device
/dev/st0
```

Here the mount point of the CDROM is assumed to be /mnt/cdrom.

F.7.3.3 Remote Tape and Local CDROM

Insert the system backup tape (write-protected) into the remote tape drive and the SIGMET IRIS release CDROM into the local CDROM drive (this has the **sigbru** command utility on it). The command is similar except that the network nodename of the workstation with the tape drive is specified.

```
# cd /mnt/hdaN (hdaN is the number of the main partition
from df)
# /mnt/cdrom/linux/sigbru/sigbrush -extract -device
/dev/st0 -node nodename
```

F.7.3.4 Local or Remote Tape and Remote CDROM

*Getting the***sigbru***Program Over the Network*

If you have a remote CDROM, then you must copy the **sigbru** files over the network to a directory on your local machine. The example procedure

assumes that the "rcp" command is working (remote copy). ftp could also be used. The procedure for doing this as follows.

First create a special **sigbru** directory (/root/sigbru) on the local machine to hold the **sigbru** files. On the local computer that is to be restored type (as root):

```
# cd /root
# mkdir sigbru
```

The next step is to copy the **sigbru** files to the directory /root/sigbru. The minimal required files are called sigbrush and gnutar and are stored on the CDROM under the directory for your platform (e.g., */cdrom/linux/sigbru*). They can also be found in the */usr/sigmet/bin* directory of an IRIS system on the network. You can obtain them from either place.

Getting **sigbru** *from a remote CDROM*

Insert the IRIS CDROM into the remote machine and mount it (see the *IRIS Installation Manual*). On Linux systems this is usually accomplished by typing (as root on the remote computer with CDROM):

```
# mount /dev/cdrom
```

Next, copy the two files from the remote CDROM to the local computer's */root/sigbru* directory. On the local computer (where you want to store the files in /root/sigbru) type:

```
# rcp nodename:/cdrom/linux/sigbru/sigbrush /root/sigbru
# rcp nodename:/cdrom/linux/sigbru/gnutar /root/sigbru
```

Nodename is the name of the computer with the CDROM. The local computer now has the **sigbru** files stored in a directory called /root/sigbru.

Getting **sigbru** *from a remote computer with IRIS installed*

Identify the remote computer with the installed IRIS system. The two **sigbru** files that you need to copy are stored in the /usr/sigmet/bin directory. Copy them to the /root/**sigbru** directory on the local computer by typing (on the local computer):

```
# rcp nodename:/usr/sigmet/bin/sigbrush /root/sigbru
# rcp nodename:/usr/sigmet/bin/gnutar /root/sigbru
```

Nodename is the name of the remote computer with IRIS installed. The local computer now has the **sigbru** files stored in a directory called /root/sigbru.

Now follow the steps below to do the restore from tape to the main partition.

- For a local tape drive type:

```
# cd /mnt/hdaN
# /root/sigbru/sigbrush -extract -device /dev/st0
```

- For a remote tape drive type:

```
# cd /mnt/hdaN
# /root/sigbru/sigbrush -extract -device /dev/st0 -node
nodename
```

Nodename is the name of the remote network computer with the tape drive. /dev/hda*N* is the device name of the main partition from df.

We are now ready to configure Linux to boot from either the main partition or the mini-root partition.

F.7.4 Step 3: Configuring to boot from the main or mini partitions

We have restored the backup to the main partition. Now we must configure the system to boot from the main partition. We keep the mini-root partition since we might need it in the future restore operations.

First, if it is not already booted, boot your computer. It boots in the mini-root partition since we have not activated the main partition. Also, if it is not mounted, mount the main partition with:

```
# mount /dev/hdaN /mnt/hdaN
```

F.7.4.1 Modify /mnt/hda*N*/etc/fstab on the Main Partition

For this step, you need to know what your disk partitions are. These were just configured, but to refresh your memory you can use fdisk, i.e. type,

```
# fdisk -l /dev/hda
```

The disk partition information should look something like:

```
Device     Boot       Start      End        Blocks     Id         System
/dev/hda1  *          1          99         205789+    83         Linux
```

```
/dev/hda2             100        1018       1910601    5          Extended
/dev/hda5             100        163        133024+    82         Linux
                                                                   swap
/dev/hda6             164        1018       1777513+   83         Linux
```

In this example, hda1 is the mini-root partition, hda2 is an extended partition that contains two logical partitions, i.e., the swap space in hda5 and the main partition in hda6. This is the information that we need to edit fstab in the main partition.

Start the "vi" editor on the fstab file by typing:

```
# vi /mnt/hda6/etc/fstab
```

The file should look something like ("/" is incorrectly pointing to the min-root):

```
/dev/hda1       /              ext2           defaults        1 1
/dev/cdrom      /mnt/cdrom     iso9660        noauto,owner,   0 0
                                              ro
/dev/hda5       swap           swap           defaults        0 0
/dev/fd0        /mnt/floppy    ext2           noauto,owner    0 0
none            /proc          proc           defaults        0 0
none            /dev/pts       devpts         gid=5,mode=     0 0
                                              620
```

"/" is currently pointing to /dev/hda1. Change this to /dev/hdaN where N corresponds to your main partition. Also check that the swap partition is pointing to the correct disk partition. In the example, the swap partition from fdisk is /dev/hda5 so the fstab entry for swap is OK. However for this example, the entry for /dev/hda1 pointing to "/" needs to be changed to /dev/hda6. After you have finished editing, save your results and proceed to the next step.

F.7.4.2 Modify /etc/lilo.conf File on the Mini-root Partition and Run lilo

The file /etc/lilo.conf on the mini-root partition is used to configure the LILO boot loader. We use the mini-root version since we do not yet fully trust our restore and the mini-root is fully tested.

First, we need to document the lilo.conf file on the main partition. Do this by typing the command:

```
# cat /mnt/hda6/etc/lilo.conf
```

This shows the lilo.conf that was used on your old disk. Take note of the lines corresponding to the "image" that has the "label=linux". For example:

```
image=/boot/vmlinuz-2.2.12-20
label=linux
initrd=/boot/initrd-2.2.12-20.img
read-only
root=/dev/hda1
vga=773
append="mem=128M"
```

No changes are made to this file. We use this information to edit */etc/lilo.conf* in the mini-root. As in the previous step, you use the vi editor to do this.

```
# vi /etc/lilo.conf
```

The mini-root lilo.conf file looks something like:

```
boot=/dev/hda
map=/boot/map
install=/boot/boot.b
prompt
timeout=50
default=linux
image=/boot/vmlinuz-2.2.12-20
label=linux
initrd=/boot/initrd-2.2.12-20.img
read-only
root=/dev/hda1
```

You only need to make one change to these lines, that is:

- Change the "label=linux" to "label=miniroot"

Now after these lines, type-in the lines that you recorded and make the following changes to them (hdaN refers to the main partition):

- Change "image=/boot..." to "image=/mnt/hdaN/boot..."
- Change (if necessary) "label=linux"
- Change "initrd=/boot..." to "initrd=/mnt/hdaN/boot..."
- Change "root=/dev/hda1" to "root=/dev/hdaN"

All other lines should stay the same since. When you are done, the */etc/lilo.conf* file (mini-root) should look something like:

```
boot=/dev/hda
map=/boot/map
install=/boot/boot.b
prompt
timeout=50
default=linux
image=/boot/vmlinuz-2.2.12-20
label=miniroot
initrd=/boot/initrd-2.2.12-20.img
read-only
root=/dev/hda1
image=/mnt/hda6/boot/vmlinuz-2.2.12-20
label=linux
initrd=/mnt/hda6/boot/initrd-2.2.12-20.img
read-only
root=/dev/hda6
vga=773
append="mem=128M"
```

Carefully check your entries and save the file. Now run lilo by typing:

```
# lilo -v
```

Carefully check that lilo runs without errors. Errors are most likely due to typo's and should be repaired by re-editing the /etc/lilo.conf file. Re-run lilo until it is error free.

At this point we have two bootable partitions that can be selected at boot time at the "LILO:" prompt. The main partition can be booted by:

- Typing "linux".
- Simply hitting the ENTER key.
- Waiting for the timeout (50 seconds in the example).

The mini-root partition can be booted by typing "miniroot" at the LILO prompt. Perform the following tests to verify that you can boot either partition:

- Issue the "reboot" command and type "miniroot <Enter>" at the LILO prompt to verify the mini-root boots OK.
- Issue the "reboot" command and type "linux <enter>" at the LILO prompt to verify that the main partition boots OK.

Proceed to the next step.

F.7.4.3 Modify the /etc/lilo.conf File on the Main Partition and Rerun lilo

NOTE Note: If you restored a backup of the main partition for a system that was already configured for the min-root, then your /mnt/hda6/etc/lilo.conf file may not require any modification. Check it by going through the procedure below.

We need to configure the /etc/lilo.conf file on the main partition so that if lilo is run here, it installs the boot record for both the main and the mini-root partitions. To do this, first reboot the system in the main partition and at the LILO prompt type linux, that is:,

```
LILO boot: linux
```

After reboot, manually mount the mini-root partition, i.e. (with N corresponding to the mini-root partition),

```
# mount /dev/hdaN /mnt/hdaN
```

If this does not work, you may have to first create the mount point, i.e.,

```
# mkdir /mnt/hdaN
```

Now look at the lilo.conf file in the mini-root by typing:

```
# cat /mnt/hdaN/etc/lilo.conf
```

This looks something like the previous example. Copy by hand all the lines corresponding to the mini-root label. For example:

```
image=/boot/vmlinuz-2.2.12-20
label=miniroot
initrd=/boot/initrd-2.2.12-20.img
read-only
root=/dev/hda1
```

Use vi to edit the */etc/lilo.conf* file (main partition). Add the lines that you copied for the miniroot, with the following changes (here N refers to the mini-root, 1 in the example):

- Change "image=/boot..." to "image=/mnt/hda*N*/boot..."
- Change "initrd=/boot..." to "initrd=/mnt/hda*N*/boot..."

- The miniroot "root" line should already point to the proper partition for the mini-root.
- Change (if necessary) the linux "root" line to point to the main partition.

When you are done the /etc/lilo.conf file (main partition) should look something like:

```
boot=/dev/hda

map=/boot/map

install=/boot/boot.b

prompt

timeout=50

default=linux

image=/boot/vmlinuz-2.2.12-20

label=linux

initrd=/boot/initrd-2.2.12-20.img

read-only

root=/dev/hda6

vga=773

append="mem=128M"

image=/mnt/hda1/boot/vmlinuz-2.2.12-20

label=miniroot

initrd=/mnt/hda1/boot/initrd-2.2.12-20.img

read-only

root=/dev/hda1
```

In this example, hda1 is the miniroot partition and hda6 is the main "linux" partition. Save your results and then run lilo:

```
# lilo -v
```

Carefully check that lilo runs without errors. Errors are most likely due to typo's and should be repaired by re-editing the /etc/lilo.conf file. Re-run lilo until it is error free.

Reboot both the "miniroot" and main "linux" partitions to test them, then proceed to the next (final) step.

F.8 Test IRIS and Backup Your Restored System

At this point you should test IRIS in its full operational mode. All should be as it was before. Note that if you separately archived ingest clutter maps (as RAW products), RAIN1 clutter maps or special "kept" data files, you should restore them now.

After IRIS has been tested, you should then do a backup of your system. Only the main partition need be backed–up. Follow the procedure in "Making System Backups for Linux Computers" on page 182 and subsequent sections to record the df, fdisk and netconf information as part of your backup. You should of course maintain this backup over the years.

F.9 Disk Crash After Mini-Root is Installed

When your next disk failure occurs (hopefully 10 years from now), if the disk hardware is OK and the miniroot is still intact, you can restore your disk more easily- just boot the mini-root and start your restore procedure at Step 2 ("Step 2: Restore the sigbru backup to main partition" on page 196). Since you faithfully carried-out the backup prescribed in preceding section, your backup is the main partition that you want to restore.

NOTE If you use an existing miniroot to restore your main partition from a backup tape, be sure to go through all of the steps of running lilo in both the mini-root and then the main partition. Failure to do so might cause your system to become un-bootable, in which case you would have to re-install the mini-root. Do not skip steps in the procedure, although you have less work to do since all the files in the main partition should be configured properly already.

F.10 sigbru -auto: Auto Archive Features

A powerful feature of **sigbru** is the auto archive feature. This allows **sigbru** to monitor a disk directory so that when a specified "quota" of files is placed there, **sigbru** automatically:

- Archives the files to tape (or perhaps disk).
- Optionally deletes the files in the directory that is being monitored.

Note that if the optional delete is enabled, then **sigbru** continues to monitor the directory and write sequential archives to the tape. Otherwise, the auto archive is to disabled, i.e., it is "write-once".

An ideal application of this is as follows:

- Use the product output menu to send files in .gif format to a directory.
- Use **sigbru** -auto to monitor the directory, and when a selected size is reached, archive the files to tape.
- **sigbru** can then delete the disk files so that the disk does not fill-up.

To be on the safe side it is always best for IRIS to send disk files to a directory that is on a separate disk partition, i.e., not / or /usr, since filling the disk space in these causes the system to fail. The /usr/iris_data directory is also not a good choice since filling this causes IRIS to fail. We recommend that if you do this, you create a separate disk partition for the directory.

NOTE Only tape drives support multiple automatic archive files. The tape must use a non-rewind driver (e.g., /dev/nst0 for linux).

WARNING If you inadvertently specify a tape device driver that performs rewind on opening, then attempt to do multiple automatic archives to tape, then the you always overwrite the last archive. That is, when you are done only the most recent archive is on the tape.

To invoke the auto archive features of sigbru, start by typing as root:

```
# sigbru -auto
```

At the bottom of the **sigbru** menu (in "Backup" mode), you see the following:

Figure 5 sigbru Menu (Bottom of Dialog Box)

F.10.1 Auto Archive Enable/Disable

This defaults to disabled when you start **sigbru** unless you specify **-enable** at startup. This enables the automatic polling of the "Included" directories that are to be archived.

F.10.2 Archive Source: Quota and Current, sigbru Polling

Type-in the quota in GB. When Auto Archive is enabled, **sigbru** polls the included directories and calculates the total size of all files that are more than one minute old. This is updated every 5 minutes and the result is displayed in the field called **Current**. When the **Current** size exceeds the **Quota** that you specified, **sigbru** performs an archive operation for all included files that are more than one minute old.

Note that the max size of a DVD archive quota is 4 GB — the size of a typical DVD.

F.10.3 Archive Media Use: Total and Record

These are display-only text fields are valid only during automatic archive operation. They are not valid during manual archive operation when the operator clicks the **Start** button.

- **Total** shows the total size of all files that have been written to the archive medium. The total is uncompressed. If you use compression, then the actual amount written is less.
- **Record** # shows the number of archive records that have been written to the tape, i.e., whenever the **Quota** is exceeded.

F.10.4 Delete Files After Archive

WARNING This is a potentially dangerous command, since you might end up deleting key system files if you are not careful to specify the Included files correctly.

The **Delete Files after Archive** feature is designed for automatic maintenance of a disk directory. See the example at the beginning of "sigbru -auto: Auto Archive Features" on page 206

This defaults to **No** when **sigbru** is started unless -delete is specified at startup. It can only be set to **Yes** when auto archiving is enabled. The option is not available in the manual archive mode, that is, when the user manually clicks **Start**.

NOTE When you specify "Enable" sigbru waits for 10 seconds before polling the directory to give you a chance to set the Delete Files field.

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